

VOLUME VIII.

DEPRECIATION, FINANCIAL, GOING VALUE, LANDS, OVERHEAD
RATING BASE, RESERVOIR VALUES, WATER RIGHTS

IN THE
District Court of the United States
FOR THE
Northern District of California

SECOND DIVISION

SPRING VALLEY WATER COMPANY,
Plaintiff,

vs.

CITY AND COUNTY OF SAN FRAN-
CISCO, Et AL.,
Defendants.

Nos. 14,735, 14,892,
15,131, 15,344, 15,569,
Circuit Court of U. S.,
Ninth Judicial Cir-
cuit, Northern Dis-
trict of California,
and 26 and 96 District
Court of U. S. North-
ern District of Cali-
fornia, Second Divis-
ion.

ABSTRACT OF TESTIMONY TAKEN BEFORE HONORABLE
H. M. WRIGHT, STANDING MASTER IN CHANCERY FOR
THE DISTRICT COURT OF THE UNITED STATES IN
AND FOR THE NORTHERN DISTRICT OF CALIFORNIA,
SECOND DIVISION, IN THE PROCEEDING ENTITLED
SPRING VALLEY WATER COMPANY vs. THE CITY
AND COUNTY OF SAN FRANCISCO, Et AL., IN EQUITY
NOS. AS ABOVE.

For Defendants:

PERCY V. LONG, Esq.

ROBERT M. SEARLS, Esq.

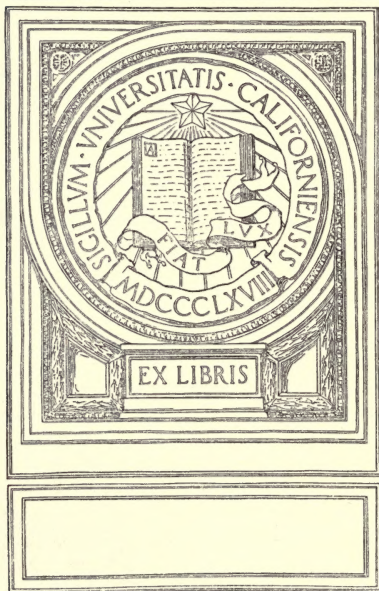
EDWARD J. McCUTCHEN, Esq.,

WARREN OLNEY, JR., Esq.,

A. C. GREENE, Esq.,

Solicitors for Plaintiff.

UNIVERSITY OF CALIFORNIA
LOS ANGELES



52587
1914
V. 8

ONE HUNDRED AND THIRTY-FIRST HEARING.

APRIL 5, 1916.

Witnesses: JOSEPH R. RYLAND for Plaintiff.
CHAS. H. LEE for Defendants.

(Certain corrections noted in the transcript.)

9540-954

Witness: JOSEPH R. RYLAND for Plaintiff.

Rylan

DIRECT EXAMINATION BY MR. OLNEY.

I am president of the San Jose Water Co., and reside in San Jose. I am 52 years of age. I have been connected with the San Jose Water Co. for 21 years. When I first became connected with the company I was a director and chairman of the finance committee. Then I was vice-president; then secretary, and now I am president. I was in the banking business part of the time that I was a director of the company, and also previously to that time. I conducted my banking business at Los Gatos, Santa Clara County, California.

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I am acquainted with the sale of what is known as Robert Springs by M. L. and R. G. Emmerson, in May, 1898, to the San Jose Water Co. We paid \$3,000 for the property, the safe dependable yield of which was in the neighborhood of 40,000 gallons per day. There were no improvements on the property, which consisted of 3.7 acres.

I had a very good knowledge of land values at the time of this sale, which is located about a mile north of the town. I resided at that time in Los Gatos, and was acquainted with land values thereabouts. The value of the land included in this purchase was not exceeding \$250 an acre.

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I was acquainted with the sale of the Hill well, in September, 1898, by Levy Hill, to the Mountain Springs Water Co. It consisted of 1.07 acres, located about a half a mile north of the town of Los Gatos, and the purchase price was \$3,000. There were no improvements and the value of the land was not exceeding \$250 an acre. The safe dependable yield was in the neighborhood of 40,000 gallons per day.

CROSS EXAMINATION BY MR. SEARLS.

There were no improvements on the Robert Springs property. It was partially cultivated with a few fig trees and pear trees, and some blackberry vines growing wild. It is partially a side-hill, being between the floor of the valley and the bench of the creek before you come to the real creek bed. It is toward San Jose.

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In the San Jose case the original cost estimate, from all the data which could be had, was made by me, and that was accepted by the Railroad Commission as the original cost of the water rights of the

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San Jose Water Co., with this addition, that they added 10% to what I had originally estimated the costs to be to cover abstracts, attorneys' fees, and contingencies of that kind. That was the figure they used in their valuation. This valuation by the Railroad Commission was as of December 31, 1913.

Lee

Witness: CHAS. H. LEE for Defendants.

DIRECT EXAMINATION BY MR. SEARLS.

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I reside in South Pasadena, and am 33 years of age. I am a civil and hydraulic engineer by profession, and have been engaged in the practice of that profession, including training in the university, some 15 years. My education consisted of a four-year course in the University of California in the Department of Civil Engineering. I graduated in the Class of 1905. I made special studies of hydrographic and hydraulic subjects, and water supply. After graduating, I was engaged for a year with the United States Geological Survey on stream gagings and other hydrographic work throughout the State of California. In 1906 and on to the year 1912 I was engaged with the engineering staff of the Los Angeles Aqueduct, most of the time as assistant engineer, where I was closely associated with the chief engineer, William Mulholland. During the early period of service I had charge of field survey parties, and assisted in office designs, and so on. From 1908 to 1911 I was in charge of the water supply investigations in Owens Valley, where I made exhaustive studies of the hydrographic conditions, in connection with the proposed development by the City of Los Angeles. Part of the work was an extensive study of the underground water supply of a portion of Owens Valley. This work was carried on in connection with the United States Geological Survey, and my report was published by the Government as a public document. During this period I advised and assisted in connection with the purchase of riparian lands on Owens River, lands with ditch rights attached, and reservoir lands, both surface and underground. The total acreage acquired by the city in this connection exceeded 125,000 acres. I also made investigation of irrigation practice and conditions in Owens Valley, including the Mutual Water Companies operating there. During part of 1911 and 1912 I was in charge of field survey for six large hydro-electric power plants, and 300 miles of transmission line for the City of Los Angeles.

In 1912 I made investigations and reports of underground water supplies in several Southern California valleys for the California State Conservation Commission, making a particular study of spreading of flood waters for the replenishment of underground water supply. The results of these investigations were published in the 1912 report of that Commission.

SPRING VALLEY WATER CO. VS. CITY AND COUNTY OF SAN FRANCISCO

In 1912 I made a short field study and report for the Spring Valley Water Co. on the evaporation from moist lands in Livermore Valley. Since 1912 I have been engaged in general practice as a hydraulic engineer in California, Nevada and New Mexico. I have been engaged in various kinds of work such as appraisal of hydro-electric, irrigation, and domestic water supply systems, including water rights, in connection with financial transactions. I have made detailed studies of the water rights and water yield of the Cuyamaca and Sweet Water Company systems in San Diego, California. I was employed by those companies to make these studies for the State Railroad Commission.

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I have made water supply investigations and reports in connection with land purchases and acquisition of new sources of supply. I have carried on extensive hydrographic surveys in connection with the adjudication of water rights on Rio Bonito, New Mexico. I have made a study of mutual water companies in various parts of Southern California in 1912 in connection with proceedings before the State Railroad Commission. I am, at the present time, carrying investigations of underground water supply throughout San Diego for the United States Geological Survey. I am, at the present time, engaged in a consulting capacity by the City of San Diego, in connection with the auxiliary pumping system in Mission Valley; the City of Los Angeles in connection with the hydro-electric power development project, in Inyo and Mono Counties; the Cuyamaca Water Company, and the Voleau Land & Water Co., in San Diego County; the United States Public Health Service, in connection with water supply at the large sanitarium at Fort Stanton, New Mexico; and the United States Department of Justice, in connection with the litigation in which the Government is involved in the matter with regard to the ground water situation there on certain Government land in connection with the Truckee-Carson Reclamation Project.

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I have been engaged more or less continuously since May 15, 1915, in a study of the yield and value of the Spring Valley Water Co.'s water rights in Alameda, San Mateo, and San Francisco Counties. I spent during May, July and August a considerable time in gathering data with regard to mutual water companies in Southern California, and the San Joaquin Valley, and I also went over the property of the company on two occasions. I have also made a study of all the information which I could obtain relative to the property and the water rights of the company. The total time spent has exceeded five months on the various subjects.

This hydrograph is a graphical representation of the flow of water over the Niles and Sunol Dams, which occurs as waste, and is not diverted by the Spring Valley Water Co.. Also the flow, which is diverted by the Spring Valley Water Co. from Alameda Creek, together with the water developed at Pleasanton Wells.

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9555 With reference to waste over the dam from January 1, 1890, to September 30, 1900, the data was taken from the Spring Valley Water Co.'s records of daily 8 a. m. gage heights over the crest of the dam, applied to the Le Conte experimental rating period. For the period, October 4, 1900, to December 31, 1912, the waste is measured over the Sunol Dam. The records were obtained from the daily gage heights of the Spring Valley Water Co., taken several times daily in times of flood, of water levels over the crest of the dam, and applied to the current meter rating curve prepared in March, 1914, by the Spring Valley Water Co., and the City Engineers Office, in co-operation. Since January 1, 1913, and up to June 30, 1915, the records are also obtained from over the Sunol Dam, and are from the Spring Valley Water Co.'s auto-continuous gage height record, and the March, 1914, rating curve.

9556 The data representing total diversions from the Alameda system which includes water diverted directly from the flow of Alameda Creek at the filter beds at Sunol, and the water developed from the wells near Pleasanton, is not shown specifically by any line on the chart. This data from January 1, 1890, to April 6, 1903, is from the Spring Valley Water Co.'s Belmont Pump records, with 5% deduction for pump slippage. From talking the matter over with Mr. Sharon, I came to the conclusion that 5% for average working conditions would probably represent the correct value. Probably at best condition it may be as low as 3%, but taking average conditions I regard 5% as about correct. There were also 600,000 gallons per day added to the Belmont Pump after the slippage was deducted subsequent to January 1, 1900, to cover water delivered to riparian owners at Niles Cone and wastage at Niles Screen Tank. Prior to that time the amount of these deliveries and waste was comparatively small, and would not show on this diagram, because of the scale to which it is drawn. From April 6, 1903, to March 31, 1906, the data is taken from Spring Valley water records, which are thought to be at the Brightside Weir in the Sunol Aqueduct, but the information of the company is not complete in the matter. I used these records with the assumption that they were at Brightside Weir. From April 1, 1906, to June 30, 1915, the data is from the Spring Valley Water Co.'s automatic water stage register record at the Brightside Weirs. The period from August 1, to December 31, 1910, and from September 1, to October 31, 1911, on account of the Brightside Weir record being missing, the Belmont Pump record was substituted.

9557 The data with regard to water development at Pleasanton Wells, August 19, 1898, to September 21, 1901, was from weekly observations of height of dome over the casing at all flowing wells, and is from city records. From September 21, 1901, to February 29, 1904, the data is from daily weir measurements on weirs in ditches leading

from flowing wells to Laguna Creek, and is from city records. In those two periods the measurements are not as accurate as they are during the last two or three years. They were the only information available on the subject. On the scale of this diagram the relative error, if any, is not large.

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For the period from March 1, 1904, to December 31, 1910, there are no records of any measurements available of the water developed at Pleasanton Wells; the amount as shown on this diagram has been computed on the basis of 40% of the total flow at Brightside Weir, being developed from Pleasanton Wells. This gives results too great in winter and spring during the flood flow of the creek, and too small in summer and fall during the low-water flow of the creek; the average for the year is regarded as somewhere near the actual. For the period from January 1, 1911, to August 13, 1912, the data is from records in the City Engineers Office, and consists of observations of the number of turns of a 12-inch gage valve on the discharge pipe from the Pleasanton Pumps applied to a rating of the valve. In periods when the pumps are not operating, the flow from the wells is estimated by the City Engineers Office from knowledge of local conditions. This data is also approximate, and is similar in nature to that obtained in the earlier period. Since August 13, 1912, to June 18, 1915, the data is from the automatic auto-stage register record of the Spring Valley Water Co. at the weir at Sunol Water Temple, where the 30-inch pipe from the Pleasanton Wells discharges into a filter gallery. This record is accurate.

The chart is a graphical one, in which the time is laid off in a horizontal direction; one year in time is represented by a distance of about 12 inches. In other words, it is divided off into months, so that as one looks along the diagram from left to right, the period of time, commencing January, 1890, advances, finally ending with June 30, 1915, at the far end. In a vertical direction the diagram represents the discharge or flow in million gallons daily; one inch represents ten million gallons daily in flow; 10 inches represents 100 million gallons daily in flow. The highest shown on the diagram is 190 million gallons daily. The flow of the stream, as shown on this diagram, in a number of instances, far exceeds this value of 190 million gallons a day, but the tops are not shown; there is just a statement written along the edge of the diagram, the portion of the diagram most illuminating being contained, and the peaks not being of considerable interest in this discussion.

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The Pleasanton Well record commences in 1898 at the time the wells were drilled; prior to that time no water was developed in the Livermore Valley. Looking at the diagram prior to the date August 19, 1898, the heavy black line at the top represents the total natural flow of Alameda Creek and its tributaries as it would have occurred

9559 if no diversion had been made, and it all flowed over Niles Dam. That includes also the water from Pleasanton that came down Laguna Creek. The portion of the total flow of the creek which wasted down the stream, and was not diverted, is colored in brown. The blue area within the area of brown represents the water diverted by the Spring Valley Water Co. The succession of blue areas represents the volume of water diverted each year.

Questioned by Mr. Olney.

I have had full access to the Spring Valley Water Co.'s data. Mr. Sharon, at the time this diagram was first under consideration, assisted in every way that he could in getting the data of the company. He gave all the data that he was asked for, and all the records that the company had.

DIRECT EXAMINATION BY MR. SEARLS.

9560 After the period of August 19, 1898, there is a red line shown above the heavy black line preceding; that red line represents the total of all waters flowing naturally in Alameda Creek, plus the water developed from the Pleasanton Wells. The red line represents more than the total natural flow of the stream, for the reason that the water developed at Pleasanton Wells is, to a considerable extent, water which before did not appear in the stream. It was water which was lost in the evaporation in the Livermore Valley, or which, on account of the Livermore gravels being full continuously with the artesian pressure went down during peaks of these floods. It is not water which was in the stream naturally at the time. That is shown by the records as they occurred there at the time the Spring Valley Water Co. was developing. The black line which is under the red line is, as near as can be determined, the natural flow of the stream. In the periods of flood it is quite probable that the black line might be changed somewhat by the fact that the absorption of the gravels was greater subsequent to the Spring Valley operations at the Pleasanton Wells than before; the flood records are somewhat approximate, but as compared with the low-water records, the error if shown here would not be great, and that does not affect the diversion; it might raise the whole thing up slightly. In this period where the red line is shown, the water diverted by the company from the natural flow of Alameda Creek is shown in blue, and is obtained by subtracting from the total diversion of the company the water developed at Pleasanton Wells according to the record.

In the periods of flood flow, which are shown by the brown line, when there is waste over Niles or Sunol Dam, the water developed from Pleasanton Wells is shown on top of the heavy black line, or on top of the brown coloring, separated from the natural flow of the stream which was diverted. This red line is accurate as to the total diversion of the company, plus the flood flow, but it includes certain waters

developed from the Pleasanton Wells which did not appear in the stream before, or at least did not appear in the stream at that time of the year; it may have appeared to a certain extent in the flood period.

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Questioned by Mr. Greene.

The black line, running from August to November of 1901, was located by subtracting from the total water diverted by the company, as shown by the red line, the water developed at Pleasanton Wells. The assumption is that the water developed at the Pleasanton Wells is none of it is part of the natural flow at that time. Prior to any development of the Spring Valley a part of it might have appeared in the stream at the time of flood flow. It is my opinion that a considerable part of it was formerly lost by evaporation. There has been a very great shrinkage of evaporating error in the Pleasanton vicinity, and a consequent decrease in the natural loss of water which the pumping of the Spring Valley has conserved. The diagram during the period of absence of record at Pleasanton Wells is estimated entirely, and shows approximately only the separation of the natural flow water in Alameda Creek, and the Pleasanton Wells, and is not intended to represent anything accurate at all. The amount, as shown here as being the natural flow of the stream in the fall of the year, for instance, in September and October, 1904, as a matter of fact is considerably less than is shown on this diagram.

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DIRECT EXAMINATION BY MR. SEARLS.

I have not used the figures which I have estimated in that manner in determining my safe yield of the system. It was merely for getting an approximate idea on this diagram of the conditions during that time. During that period the red line is absolutely accurate for the reason that the total diversion of the company, and the total waste, are both measurements. The position of the light dotted black line which separates the blue from the uncolored portion, is determined approximately.

The measurements are approximate from January 1, 1911, to August 13, 1912, and from then on are very reliable. The period covered by the most accurate records of the Pleasanton Wells development is subsequent to August 13, 1912.

During this period of the last four years, which is included within the period of time under consideration in this case, I investigated these records with a view to determining what the yield of the Alameda system might be with respect to the capacity of the Alameda pipe line across the bay. The diagram and the records from which it is prepared indicate that the diversion from the natural flow of Alameda Creek was very small during the latter six months of 1912 and 1913, and it also indicates that there was no waste over the Sunol Dam during this period. The red line showing the total of the water

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diverted from the flow of the stream, and the Pleasanton Well water during the fall of 1912, does not exceed 10 million gallons a day, as an average, for several months. The same is true in the latter part of 1913. An examination of the well fluctuation records in the Livermore Valley indicates during the same period, particularly in 1913, a marked lowering of the water level beneath lands not owned by the company. The opinion which I have formed from a very careful study of the situation of the ground water conditions in the valley is that the Livermore Valley gravels were drawn upon to their extreme limit, as far as the rights of the company are concerned, during that period; the lowering of the water level in some instances in the upper part of the valley during the fall of 1913, was as great as 50 feet, as indicated by the well records, which have been obtained by both the city and the Spring Valley Water Co. By the upper part of the valley, I mean the region about one or two miles west of Livermore, which is some six miles above Pleasanton. This is entirely off of and above any of the lands owned by the Spring Valley Water Co.

The conclusion which I have drawn is that it would have been impossible, under the existing facilities of the company, or without very materially lowering the water level even below what it actually was lowered, to increase the draft during the fall of 1912 and of 1913; the total development during those periods was some 10 million gallons a day, which is considerably less than 21 million gallons a day, the capacity of the pipe line. During the spring months, when the flood flow of the creek was in progress—which was very diminutive during the years 1913 and 1912—the diversion in total from both the creek and the Pleasanton Wells was at short periods up to 21 million gallons a day, but it was not maintained constantly throughout the year, and could not have been under the conditions. The conclusion to be drawn is that the safe dependable yield of the system, as it was during the period 1907 to 1914, inclusive, was not the full capacity of the Alameda pipe line, but some less quantity. In view of the fact that the water levels were drawn as low as they were in the Livermore Valley, it is my opinion that the actual diversion of the company during this period represents the safe dependable yield of the system. This period 1912 and 1913 is one of what we call the critical periods in the hydrographic history of this part of the State, and in ascertaining safe dependable yields, consideration must be given to the yield during the dryest periods of record, when domestic supplies are under consideration.

(This hydrograph was introduced and marked "Defendants' Exhibit 187".)

Referring to the exhibit which I have before me, the last four pages are a tabulation of the detailed data from which a portion of Exhibit 187 was prepared. The sheet entitled "Draft on Pleasanton

"Wells, in Million Gallons" is a summation by months and years of the quantities shown daily on this Exhibit 187 for the corresponding months and years; a statement at the bottom occurs as to the source of the data, corresponding with that on the hydrograph, Exhibit 187. The data which is missing for certain years there is the portion that has been computed on the diagram.

(Maps and hydrographic data, with sources of supply of the Spring Valley Water Co. introduced and marked "Defendants' Exhibit 188".)

Taking first the three tables at the bottom of the exhibit, the second table, entitled "Draft on Pleasanton Wells" corresponds with the first, and is figured daily in million gallons, instead of in million gallons each month. The third table, entitled "Spring Valley Water Co. diversion from Alameda Creek, exclusive from water developed from "Pleasanton Wells in Million Gallons", sets forth the data as shown on the diagram with the same period in which the developed water from Pleasanton Wells which is missing is omitted. The fourth table is the same as the third table, with the conversion into million gallons per day.

The first map in the front part of this exhibit shows the Lake Merced source of the Spring Valley Water Co., with the lands owned in fee by the company, and the lands which are claimed by the city as used and useful, and the boundary of the drainage area tributary to Lake Merced, all upon the United States topographical map of the region as a base. There is also shown the main pipe lines and the pumping plants of the company. The next map shows similar data for the Peninsular sources of the company, and in addition shows the riparian lands for which riparian rights have been acquired, as indicated on the Spring Valley atlas sheet. With respect to the riparian rights on Pilarcitos, this map shows the boundaries of riparian lands as they were originally purchased. At the present time the owner-ships in fee of lands in this region are in much smaller tracts than at the time the riparian rights were purchased. The present fee parcels along Pilarcitos Creek in private ownership are confined to a comparatively narrow zone, and that zone is not shown on this map.

The third map shows the lands of the Spring Valley Water Co. owned in fee on the trans-bay sources of Alameda Creek and its tributaries, and also lands which the city claims are used and useful, and the lands for which riparian rights were acquired by the company at various times; also the boundary of the drainage area as far as it is shown on the map as here indicated. The line in red indicates the boundary of the drainage area. There is also indicated the approximate boundaries of Niles Cone; this is shaded in a darker color, as indicated on the map of the United States Geological Survey in a report on the Niles Cone which was recently published; it also shows

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various other features of the Niles Cone, among others the fault line crossing the head of the cone, as shown in the United States Geological Survey Report. This is indicated by a heavy line. There is also shown the approximate boundary of what is known as the gravel bed area at the head of the Cone. Within this gravel bed area the map has been dotted. The gravel bed area is rather illy defined on the south as determined by an investigation of well logs, but it is fairly accurately determined on the west and northwest.

The information as to the lands used and useful, as claimed by the city, was obtained from the Valuation Department of the City. Those are the lands in red. I got my information from the same source as to the land shaded in red, appearing under the legend "Lands used and useful as claimed by the city subsequent to 1912."

9569 This is not my data; it is the data given to me. I express no opinion as to the utility of the property at all. I have merely indicated what I have been told.

DIRECT EXAMINATION BY MR. SEARLS.

I have prepared an estimate of the original cost of the Spring Valley Water Co.'s water rights which is contained in this memorandum which I have before me.

9570 ("Original cost of water rights of Spring Valley Water Co. used in supplying San Francisco with water, as estimated by Chas H. Lee", introduced and marked "Defendants' Exhibit 189".)

9571 The following report is a compilation of various data and conclusions therefrom which I have assembled for the purpose of determining as fully as possible the original cost of the water rights in use by the Spring Valley Water Company for supplying water to the City and County of San Francisco. I found, by examination of the reports and audits by Messrs. Wenzelburger and Bailhache of the Spring Valley Water Works and Spring Valley Water Company investment accounts (Exhibits 186 and in this case)—that no separate water right account was kept by the companies. On a few of the "new construction" accounts for which detail is available, charges are made to riparian rights, but these are very few in number, largely due to the loss of the company's cash books covering the periods when the majority of such purchases were made. In only one instance is the total amount charged to "riparian rights" available, but this is without any detail. The purchases of appropriated water rights are not segregated or described so that they can be identified, and in some instances are apparently not on the books. I, in the absence of complete records of account, have searched all other sources of information which have occurred to me or have been suggested. Search has been extended to the records of account of the company as compiled by Messrs. Wenzelburger and Bailhache (Exhibits

186 and), the various published copies of the Municipal Record, extracts of testimony before the Board of Supervisors in water rate investigations since 1884, the record of testimony and exhibits in the rate suits for 1903-04, 1904-05 and 1905-06, records of court proceedings in various cases in which the Spring Valley Water Company has been involved, copies of minutes of the Spring Valley Water Company and its predecessors prior to 1905, copies of minutes of Washington and Murray Township Water Company, copies of deeds, abstracts of titles, the Inventory of the Physical Properties and Structures of the Spring Valley Water Company as of Dec. 31, 1913, prepared jointly by the representatives of the Spring Valley Water Company and the City of San Francisco, the officers and employees of the Spring Valley Water Company, and other sources of information.

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I have endeavored to include every possible item of cost chargeable to water rights. There have been included two large items which in my opinion are not wholly chargeable to water rights, but for which insufficient information was available to attempt segregation. The total cost which is reached as a result of this study I regard as in excess of what might be termed the company's actual reasonable existing investment in water rights.

I. DEFINITION

The term "water rights," as understood by me, includes the right to the continued flow or occurrence of natural streams or other bodies of water and the use thereof. Water rights in surface waters are commonly classified as either riparian rights or rights based on appropriation and use. The term water rights also includes rights to underground waters, based either on the natural position of the overlying land with respect to the supply or of use.

The above classification of water rights will be followed in the analysis and estimate of cost of the water rights of the Spring Valley Water Company and its predecessors now in use by the company in supplying water to the City and County of San Francisco.

II. COST OF RIPARIAN RIGHTS

Under this heading are considered riparian rights which the Spring Valley Water Company has acquired separate from the land, or has "extinguished." Where riparian land was purchased in fee, the cost of the riparian right was considered as having been included in the cost of the land and valued with lands.

Riparian rights have been acquired separate from land by the Company on three of its stream sources, namely, Alameda Creek, Pilarcitos Creek and San Mateo Creek. No riparian rights separ-

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ate from land have been acquired on Lake Merced as far as I have been able to ascertain.

The list of riparian rights thus acquired was obtained from the "Inventory of Physical Properties and Structures of the Spring Valley Water Company, as of December 31, 1913," under the subdivision "Riparian Rights." (Table 1.)

The separate items are listed on Table 1, each under the proper source of supply, and on Alameda Creek are segregated with reference to two points of diversion, Niles Dam and Sunol Dam. The "Map" and "Parcel" numbers are as they appear on the Spring Valley atlas sheets and in the Inventory. The "date of purchase" and "grantor" are also as they appear in the "Inventory." The amount paid in cash for each item was obtained from the various sources as indicated in Table 1, in the column "Authority for Cost."

The column headed "Remarks" refers in several instances to specific amounts of water which, by the terms of the deed, the company agreed to deliver to the grantor for use on his own land. In all but one instance, A. M. Parrot, et al., on San Mateo Creek, such water is to be delivered free to the grantor. In the latter case the price is 5c per 1,000 gallons.

That statement is somewhat in error; there is one other purchase, the Howard & Bowie tract, on San Mateo Creek, for which the price is 5c per 1,000 gallons, as shown on Table No. 1; the Howard & Bowie data was ascertained subsequently to the writing of the statement, and was omitted inadvertently.

An investigation of the amount of water to be delivered under the terms of these deeds shows that it does not in any case exceed the riparian owners' proportional share in the average natural summer flow of the stream at the point of diversion by the Spring Valley Water Company. Water to be delivered by the Company under the terms of these deeds is therefore considered by me as a partial reservation by the riparian owner of his right in the normal flow of the stream. In ascertaining the amount represented by each riparian owner's proportional share of the flow of the stream two methods were used; first, the per cent that the acreage of his land was to the total riparian acreage on the stream below the point of diversion was ascertained and applied to the average natural summer flow of the stream. The average natural summer flow of the stream is chosen because at that time his share would be the smallest in volume. Second, the percent that the linear riparian frontage of his land on the stream was to the total riparian frontage on the stream below the point of diversion was ascertained and applied to the average natural summer flow of the stream. The total riparian acreage on Alameda Creek below Niles Dam, including the riparian tracts for which riparian

rights were acquired by the company and lands owned in fee by the company, is 6,306.77 acres. The similar acreage below Crystal Springs Dam on San Mateo Creek and within the watershed, is 3,713.55 acres. These acreages are from the "Inventory" and the Spring Valley atlas sheets 63, 66, 11 and 3. The total riparian frontage on Alameda Creek below Niles Dam is 145,360 feet, and on San Mateo Creek below Crystal Springs Dam 59,900 feet, as scaled from the Spring Valley atlas sheet or taken from the "Inventory". The average natural summer flow of Alameda Creek during the months May to September at Niles Dam was approximately 17.3 million gallons per day (Exhibit 187).

The quantity of 17.3 million gallons per day was obtained by taking the data from which the diagram was prepared and averaging the monthly statement.

The flow of San Mateo Creek at Crystal Springs Dam site, although large during the winter months, has been during the late summer as low as 1,000,000 gallons per day. (Testimony of H. Schussler in case of Spring Valley Water Works vs. San Mateo Water Works, California Supreme Court Record, Vol. 1185, page 73.) Considering the months May to September it is my opinion that the average natural flow of San Mateo Creek at Crystal Springs prior to the construction of the dam was greater than 1,250,000 gallons per day.

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That conclusion is drawn from a knowledge of the character of the coast streams, and the fact that the winter flow first rapidly decreases, and then gradually decreases, until finally the minimum of the summer is attained. The value of a million gallons per day, as determined by Mr. Schussler, if taken through the whole summer, would be somewhat more, as I understand the time when his measurement was made.

Questioned by Mr. Olney.

By the average natural flow, I mean the flow of the stream as it would have been if the Crystal Springs Dam had not been constructed, and the stream was flowing naturally during the months from May to September, averaging it year in and year out during that period. That is not the average flow at the time of lowest water. It might be lower than that during the time of lowest water for a period of a month or so; in fact the measurement by Mr. Schussler is to the effect that it is lower, but I took the average summer, May to September flow, or rather what I consider to be the May to September flow.

9577

Questioned by Master.

When I say that in my opinion the average natural flow of San Mateo Creek at Crystal Springs prior to the construction of the dam was greater than 1,250,000 gallons per day, I used that figure of 1,250,000 gallons per day, but as a matter of fact, taking

it year in and year out, I think the average would be greater than that. There is not sufficient data, though, to support any such assumption. I took the conservative amount of 1,250,000 gallons as representing at least the average, but taking it year in and year out, the average in all probability was somewhat greater than that, but I have nothing to support any such statement, so therefore, I did not attempt to base any figures on anything larger than that. The idea of getting the average minimum was to ascertain what the riparian owners' share during the summer flow period would be, so that I desired not to get any quantity that was larger than what it probably might be in order to be sure that there was no greater share apportioned to him than he actually would get. The assumption of a lower figure would be liberal to the company, because the smaller the riparian owners' share as compared with the amount that was to be delivered to him, the greater would be the burden of the company in delivering water to him.

The detailed investigation is as follows: Here follows two tables, which in detail show the different parcels on Alameda Creek and San Mateo Creek, where such agreements form part of the deed of riparian rights to the company, and the quantity to be furnished in gallons per day, and the acreage of riparian land on the stream, in the case of the first table, with a percentage of the total area on the stream; then the proportional share of the average summer stream flow which each parcel would be entitled to as a riparian parcel.

DIRECT EXAMINATION BY MR. SEARLS.

The first table is on the acreage basis, and the second table is on the foot frontage basis. An examination of the table shows that for each parcel the proportional share of the average summer stream flow exceeds the quantity to be furnished by the terms of the deed, both on the acreage basis, and on the foot frontage basis.

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ACREAGE BASIS.

Description of Parcel	Name of Grantor	Quantity to be furnished by terms of deed. Gals. per day	Acreage of Riparian land on stream		Proportional share of average summer stream flow. Gals. per day.
			Acres	Percent of Total	
ALAMEDA CREEK.					
11-660	Ellsworth, H. B.	100,000	189.92	3.0	519,000
63-662	Noia, J. M.	1,000	99.12	1.6	277,000
63-664	McWhinney, H.	10,000	25.66	0.4	69,000
63-669	Shinn, Jas.	10,000	233.79	3.7	640,000
63-670	Nichols, Jos.	3,000	60.33	1.0	173,000
63-677	Clough, J. R.	3,000	50.00	0.8	138,000
63-693	Stevenson, J. T.	2,500	404.74	6.4	1,108,000
63-697	Sanborn, D.	5,000	44.69	0.7	121,000
63-706	Peres, M. S.	1,000	57.39	0.9	156,000
63-711	Cal. Nursery Co.	137,000	463.38	7.3	1,263,000
63-716	Ferreira, M.	5,000	50.00	0.8	138,000
63-723	Lowrie, M.	1,000	319.36	5.1	873,000
11-729	Pierce, H.	42,000*	38.42	0.6	104,000
63-737	Shinn, Jas.	10,000	13.67	0.2	34,600

SAN MATEO CREEK.

66-631	Parrot, A. M. et al	109,600	458.00	9.8	122,000
66-622	Howard & Bowie	150,000	1,205.77	32.4	405,000

* Estimated amount delivered by 100 ft. of 1-in. pipe.

FOOT FRONTAGE BASIS.

Description of Parcel	Name of Grantor	Quantity to be furnished by terms of deed.	Length of Riparian frontage on stream		Proportional share of average summer stream flow.
		Gals. per day	Ft.	Percent of Total	Gals. per day.
ALAMEDA CREEK.					
11-660	Ellsworth, H. B.	100,000	3,375	2.3	398,000
63-662	Noia, J. M.	1,000	2,310	1.6	277,000
63-664	McWhinney, H.	10,000	2,020	1.4	242,000
63-669	Shinn, Jas.	10,000	4,813	3.3	571,000
63-670	Nichols, Jos.	3,000	1,160	0.8	138,000
63-677	Clough, J. R.	3,000	1,080	0.7	121,000
63-693	Stevenson, J. T.	2,500	6,284	4.3	745,000
63-697	Sanborn, D.	5,000	700	0.5	86,000
63-706	Peres, M. S.	1,000	1,454	1.0	173,000
63-711	Cal. Nursery Co.	137,000	8,590	5.9	102,000
63-716	Ferreira, M.	5,000	495	0.3	52,000
63-723	Lowrie, M.	1,000	3,629	2.5	433,000
11-729	Pierce, H.	42,000*	
63-737	Shinn, Jas.	10,000	4,950	3.4	588,000

* Estimated amount delivered by 100 ft. of 1-in. pipe.

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It is thus apparent that the Spring Valley Water Company is not called upon to deliver to any riparian owner more than his proportional share of the normal summer flow of the stream. The cost to the company of delivering this water consists in the capital cost for service pipes and connections and the annual maintenance and patrol charges. The service connections I understand are all included in the agreed inventory of physical property and allowed by the city as part of the reproduction cost of structures. Annual expenses are charged to the company's general operating expenses and I understand are allowed by the city. Hence, the original cash payments, if any, represent the full purchase price of riparian rights to the company.

The data on cost of riparian rights acquired by the Spring Valley Water Company separate from land may be summarized from Table 1 as follows:

Alameda Creek	\$341,951.53
Pilarcitos Creek	14,100.00
San Mateo Creek	177,308.60
Total	\$533,360.13

The Company has also purchased several tracts in fee on Alameda Creek between Sunol and Niles for the purpose of acquiring the riparian rights. Some of these tracts lay entirely in the stream bed, while others lay partly in the stream bed and partly on the hill slopes above. The cost of the riparian rights in the first instance can be considered as represented by the cost of the land in the stream channel. Where the parcels include both land in the channel and on the hills, segregation was not made by me in the original purchase price. It has been necessary to make an estimate in such instances of the riparian right alone.

9581

Questioned by Mr. Olney.

I took the price paid for riparian lands in the creek bottom into consideration in estimating them, and considered the lands adjacent to the stream as to what use the stream could be put to, and similar matters of that kind. I took into consideration the actual amount paid for the land in toto, and then apportioned a part of it to the riparian right on the basis I have just stated.

DIRECT EXAMINATION BY MR. SEARLS.

The statement of the individual parcels with estimated cost of riparian rights, as estimated by me, is as follows:

Parcel H-239 Sunol Land Co. and Stone.....	\$4,000
Parcel F-239 Plomteaux and Steiner.....	1,000
Parcel E-239 Feusier	3,000
Parcel D-239 King (See Table 1, Par. 11-734).....	

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This is included in Table No. 1 under riparian rights and the purchase was made originally of the riparian rights separate from the land prior to the purchase of the land in fee.

Parcel 233 Krebs	\$1,500
Parcel B-239 Mehrman	8,000
Parcel A-239 Mayborg	5,000
Parcel 224 Alameda Water Company purchases.....	

Questioned by Master.

9582

Parcel 228, which I have omitted, is a parcel which is listed by the City as land in use, and it was not included in this listing for that reason.

DIRECT EXAMINATION BY MR. SEARLS.

Parcel 224 Alameda Water Company purchases.....	000
Parcel 225 Alameda Water Company purchases.....	000

The purchase price of these parcels is included elsewhere, in what is known as the Calaveras purchase, and included later in this estimate.

Parcel 231 Clarke	\$ 4,000.00
Parcel 232 Goad	400.00
Parcel 235 Mayhew	15,000.00
Parcel 263 Ellsworth	1,126.60

Total	\$43,026.60
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On San Mateo Creek there are several riparian tracts below Crystal Springs Dam which the company has purchased in fee. The cost of riparian rights for these parcels has been estimated by me as follows:

Parcel 36 James Byrnes	\$ 925.00
Parcel 63 H. Barriolhet	5,280.00
Parcel 90 Howard and Bowie.....	3,600.00
Parcel 91 John Donald.....	670.00

Total	\$10,475.00
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Adding these items to the cost of riparian rights acquired separate from land there results \$586,861.70 as the grand total cost of riparian rights.

9583

III. COST OF WATER RIGHTS BASED ON USE

Water rights based on appropriation and past use by others have been acquired through purchase by the Spring Valley Water Company and are now in use on three of its stream sources, as follows:

Alameda Creek.

Vallejo Mills power right.

Washington and Murray Township Water Co. irrigation right.

Pilarcitos Creek.

Spanish Town Mill power right.

There have also been certain expenditures which in records and testimony in the past have been termed "water rights" purchases but which do not appear to me to come under the head of water rights based on use. These are as follows:

Pilarcitos Creek.

Miscellaneous purchases.

San Mateo Creek.

San Mateo Water Works purchase.

Lake Merced.

Clear Lake Water Company and Lake Merced Water Company purchase.

The original cost to the Company of each of these water rights has been ascertained by me as accurately as possible from the available records. Descriptions of these rights, the manner in which they were acquired and the data from which their cost was ascertained is given herewith.

ALAMEDA CREEK

9583½ Vallejo Mills Power Right. This water right was initiated in about the year 1850 by Jose de Jesus Vallejo. He constructed the grist mill known as Vallejo Mills, the so-called "stone chute" on the creek about 2 miles above Niles, a water conduit along the west bank of the stream to the mill and a tail-race back to the channel of the stream. He began to divert the water about the year 1850, using it as a motive power for the operation of the mill and returning it to the stream through the tail-race. Vallejo and his successors continued to divert and use the water in this manner up to the time it was acquired by the Spring Valley Water Company in 1875. (Court's Findings of Fact, XXII, in case of Clough vs. Spring Valley Water Works, Transcript of Testimony, pages 329 to 41). Vallejo Mills were located at the mouth of Niles Canyon just above the Town of Niles on the west side of Alameda Creek. The water used at the mill was returned to the stream at a point about 2.00 miles below the point of diversion.

9584 The findings of fact by the Court in the case of Clough vs. Spring Valley Water Works (Transcript of Testimony, pp. 332-4) state that the amount of water diverted and used at the mill was as follows:

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	Gals per day
Jan. and Feb., week days, 6 A. M. to 6 P. M.....	2,000,000
March and April, week days, 6 A. M. to 7 P. M.....	2,200,000
May to August, week days, 6 A. M. to 8 P. M.....	2,300,000
September, week days, 6 A. M. to 7 P. M.....	2,200,000
Sept., Oct. and Nov., Fridays and Saturdays falling within first 10 days, 7 P. M. to 12 P. M.....	825,000
Oct., Nov. and Dec., week days, 6 A. M. to 6 P. M.....	2,000,000
Oct., Nov. and Dec., last 20 week days of each month, 6 P. M. to 6 A. M.	2,000,000

It is also stated that the amount of water diverted was never to the capacity of the stone-chute and aqueduct. The water was brought to the mill in a wooden flume on trestle bents. (Case of Clough v. Spring Valley Water Works. Testimony of S. E. Richards, Transcript on Appeal, pp. 539-41). Originally the water passed over an over-shot wheel. (Ibid, Testimony of S. E. Richards, p. 539). In later years a 17½-inch James Lefel turbine wheel developing about 15 horse power was installed. The head of water available was about 30 feet from the forebay in the flume to the water level in the tail-race. The supply flume was about 3 feet wide and 24 inches deep, and ran water at varying depths, depending on the grade. Two stones, a 24-inch and a 40-inch, were operated together, or a 4½-foot stone alone. The output of the mill was 15 barrels of flour in 12 hours. (Case of Clough, testimony of E. J. Ismert, Transcript on Appeal, pp. 618-27).

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The Vallejo Mill property was acquired by the Spring Valley Water Works, in connection with its proposed diversion from Alameda Creek; first, because the stone-chute, located at the lowest bedrock exposure in Niles Canyon, afforded an ideal point of diversion from the creek (Testimony of H. Schussler before the Board of Supervisors, Water Rate Investigations 1899-00, p. 194-8); and second, because the power right was the oldest developed right on the stream and its ownership was necessary for complete control and diversion of the stream. (Testimony of H. Schussler before the Supervisors, Water Rate Investigations, 1895). The Vallejo Mills purchase gave the company the right of diversion from Alameda Creek only as against the riparian land between the intake at the "stone-chute" where the water was diverted and the tail-race, where it was returned to the stream. (Statement of Mr. Herrin before the Board of Supervisors, Water Rate Investigations 1889-90-91, pp. 338-9.) The Niles Dam was erected by the Company at practically the site of the Vallejo Mills stone-chute.

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The Vallejo Mills property was purchased from the Alameda Water Company, June 28, 1875, being included with other property in the "Calaveras purchase." The Alameda Water Company had acquired certain lands in and adjacent to Calaveras Valley reservoir

site, certain riparian lands on Alameda Creek, and the Vallejo Mills property. (Testimony of H. Schussler, before the Board of Supervisors, Water Rate Investigations, 1896-7, p. 62; Ibid, 1899-00, pp. 116-118, and pp. 194-8; Ibid, 1900-01, p. 50-53, etc.) The entire holdings of the Company, together with a majority of the stock of the Washington and Murray Township Water Company was acquired for \$1,000,000. (Minutes Spring Valley Water Works, April 24 to Nov. 15, 1875, and June 20, 1877; also testimony of H. Schussler, Water Rates testimony, 1902-3, pp. 207-12, 214-17, etc.) The actual amount paid for the Vallejo Mills property was not segregated at the time of the purchase. (Testimony of H. Schussler, Water Rates testimony 1902-3, pp. 214-17.)

An analysis of the various items indicates that considerably more was paid than the aggregate reasonable cost of the individual items. These items were as follows:

1. Calaveras lands (Map 16, Parcel 225)..... 1,720 acres
2. Calaveras lands (Map 16, Parcel 320)..... 120 acres
3. Lands along Alameda Creek, including Vallejo Mills stone-chute (Map 11, Parcel 224) 39.665 acres
4. Lands along Alameda Creek, including Vallejo Mills (Map 11, Parcel 225)..... 12.577 acres
5. Vallejo Mills improvements, stone-chute, aqueduct, water right, etc.
6. Majority of stock of Washington and Murray Township Water Company.....25,200 acres

9587

(Acreage for items 1, 2, 3 and 4 taken from "Inventory of Physical Properties and Structures, Spring Valley Water Company, Dec. 31, 1913, pages 352 and 371; number of shares for item 6 from Findings of Fact VIII of Court in case of Clough vs. Spring Valley Water Works, pp. 552-3.)

The market value of the Calaveras lands (items 1 and 2) at the time of the purchase is indicated by purchases of adjacent lands at about the same time by the Spring Valley Water Works, the cost being taken from Exhibit 5, filed by the Spring Valley Water Works with the Board of Supervisors in connection with water rates investigations in 1900-01 (M. R. 1900-01, Water Rates, pp. 49-50). This data is as follows:

Description of Parcel	Grantor	Date of Purchase	Area Acres	Amount Paid	Cost per Acre
16-322	Pomeroy, H.	12-1-75	160	\$11,250	70.31
16-325	Gaines, W. S.	12-1-75	800	30,000	37.50
16-324	Harris, N. R.	12-1-75	200	20,000	100.00
18-321	Campbell, D.	11-26-75	492.90	29,000	58.88
16-323	Ham, R. K.	12-1-75	200	13,500	67.50
Total and Average			1852.90	103,750	56.10

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This value of \$56.10 per acre is confirmed by the testimony of Mr. Schussler (Water Rates testimony, 1902-3, pp. 207-13, 214-17, and 553-4). He states that the land was valued at \$60.00 per acre at the time of purchase.

The market value at the time of purchase of lands along Alameda Creek above Niles including the site of Vallejo's Mills (Items 2 and 3) I have been unable to ascertain. I have assumed that the canyon lands (Item 2) would have been worth \$60.00 per acre, and the valley land at the mouth of the canyon near Niles, $2\frac{1}{2}$ times as much, or \$150 per acre.

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These lands are right above Niles and within the distance covered by the diversion conduit of the Vallejo Mills.

The value of the Vallejo Mills property from the standpoint of the original owners, Vallejo and his immediate successors, is indicated by the testimony of A. W. Von Schmidt, formerly chief engineer for the Spring Valley Water Works, before the Board of Supervisors, Water Rates Investigations, 1889-90-91, pp. 338-9, in which he states that the property was once offered to him for \$8,000. The minutes of the Spring Valley Water Works, May 31, 1865, contain a resolution of the Board of Trustees to the effect that the President be instructed to have condemned the Alameda and other principal creeks on the opposite side of the Bay for the uses of the Company. On June 14, 1865, a report from Mr. A. Von Schmidt on the Alameda Creek was read at the meeting of the trustees and laid on the table. (Minutes of Spring Valley Water Works, June 4, 1865). It is thus probable that the offer referred to by Von Schmidt was made to him at the time of his investigations in June, 1865, and represented the price at which the owners were willing to sell and in all probability did sell to the Alameda Water Company or its predecessor in interest, if any. The Alameda Water Company was organized June 28, 1865, a short time subsequent to the date of filing of Von Schmidt's report. (Case of The San Francisco and Alameda Water Company vs. The Alameda Water Company, 36 Calif. Reports, p. 642). The Company thus purchased the property subsequent to the date of the Von Schmidt investigations. The mill was a pioneer venture and its usefulness was in my opinion at a maximum in 1869, when a great impetus was given to the development of the district by the advent of the railroad. In my opinion the value of the Vallejo Mills property was less than \$40,000 in 1875.

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The Washington and Murray Township Water Company stock, according to the minutes of the annual meeting of the company August 2, 1875 (Transcript of Testimony, Case of Clough vs. Spring Valley Water Works, p. 1769), had been assessed 28 cents per share up to that date, the funds thus secured having been expended in the construction of a dam, ditches, etc., the total expenditure of the com-

9590

pany to that date being \$11,063.38. The total assessments up to August 2, 1875, to the owner of 25,200 shares of stock would therefore have been \$7,056. According to the information furnished by the Spring Valley Water Company a block of 200 shares of Washington and Murray Township Water Company stock was issued in the name of E. H. Dyer, May 29, 1871, and another block of 25,000 to the same name November 26, 1873, and both blocks were reissued in the name of Charles Webb Howard, August 3, 1876. According to Findings of Fact VIII. in Case of Clough vs. Spring Valley Water Works (Transcript of Testimony, p. 253) the Spring Valley Water Works became the owner of 25,200 shares of Washington and Murray Township Water Company stock on or about June 25, 1875, which was issued and held in the name of Charles Webb Howard for the benefit of the Company August 3, 1876. According to the testimony of Charles Webb Howard in the case of Clough vs. Spring Valley Water Works (p. 641 of transcript) the Spring Valley Water Works paid assessments on stock held in the name of E. H. Dyer. Whether the Spring Valley Water Works paid assessments on any of the Dyer stock prior to June 25, 1875, the writer has been unable to ascertain, but from his investigations it is his opinion that \$7,056 represents approximately the amount that the stock cost the Spring Valley Water Works.

Summarizing the various items, there results as my estimate of the reasonable cost, exclusive of speculative value of the property acquired in the "Calaveras purchase", the following:

Calaveras lands, 1840 acres at \$56.00.....	\$103,040
Alameda Creek lands, 39.665 acres at \$60.00.....	2,380
Alameda Creek lands, 12.577 acres at \$150.00.....	1,886
Vallejo Mills property (not more than).....	40,000
W. and M. T. W. Co. stock, 25,200 shares at \$.28.....	7,056
Total	<hr/> \$154,362

The actual amount paid, \$1,000,000, would thus appear to be considerably in excess of the aggregate reasonable cost of the individual items. Mr. Schussler, in testimony given before the Board of Supervisors in the 1900-01 Water Rate Investigation (pp. 50-53) stated that some of the directors and stockholders may have felt that more was paid for the property than it was worth and that he had advised the purchase eleven or twelve years before, when it could have been purchased for perhaps one-third the amount paid. In my opinion large speculative value and large promoter's profit were included in the actual purchase price of the Alameda Water Company properties. The exact proportion of this to be assigned to the Vallejo Mills property, it is difficult to determine. In the absence of more detailed data or knowledge of the conditions, however, the cost of

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all water-rights on Alameda Creek acquired through the "Calaveras purchase" will be obtained by deducting the segregated cost of the lands as above determined. This leaves \$892,694, which amount is confirmed by the testimony of Mr. Schussler (Water Rates Investigations, 1902-3, pp. 214-7) to the effect that "something like \$800,000 was paid for water rights."

This amount represents the actual cost to the Spring Valley Water Company of the Vallejo Mills water right and a controlling interest in the Washington and Murray Township Water Company.

9591

Washington and Murray Township Water Company Water Rights. This company was organized May 17, 1871, and its purpose as stated in the articles of incorporation was to acquire all right to Alameda Creek and its tributaries and all lands necessary for ditches, reservoirs, pipes, etc., and to supply pure fresh water to the people of Murray and Washington Townships for domestic purposes and for irrigating lands of said townships and to propel machinery, or to sell said water for said purposes. (Findings of Fact II, Case of Clough vs. Spring Valley Water Works, Transcript of Testimony, pp. 202-3). The company posted a notice of appropriation of the water of Alameda Creek near the residence of Captain C. C. Scott above Niles, the water being claimed for irrigation and family use within Washington Township. The date of first posting was between July 2 and August 5, 1872. (Minutes of Washington and Murray Township Water Company, July 2 and August 5, 1872, Transcript of Testimony, Case of Clough vs. Spring Valley Water Works, pp. 931 and 933.)

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The ditch was completed in 1875. The original heading was on the east bank of Alameda Creek on land owned by C. C. Scott, and was later moved up stream to the land of E. Clark. The heading was always below the inlet and above the tail-race of the Vallejo Mills diversion. The ditch extended westerly 3 miles through farming land susceptible of irrigation. The ditch was earthen, had a capacity of 10,000,000 gallons per day and covered about 2000 acres of irrigable land. (Findings of Fact LLL. by Court in Case of Clough vs. Spring Valley Water Works, pp. 204-5.)

The ditch was used continuously from 1875 to at least 1898, and all of the water diverted, except that lost in transmission, was beneficially used in irrigation. Water was diverted each year from March to November, the amount diverted in 1882, and found by the Court to be the right owned by the company, being as follows—the decree is very lengthy and in great detail.

The above amounts of water when assembled by months, are as follows:

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Month	Average diversion mil. gals. per day	Total volume diverted. Acre feet
March429	40.85
April	1.833	168.79
May	2.152	204.60
June	3.140	289.32
July	3.180	302.51
August	1.660	157.92
September	0.897	82.59
October	0.298	28.42
November	0.303	27.93
Total		1302.93
Average	1.55	
Average, May to October.....	1.88	

The water was used for irrigation of nursery stock, orchard, vegetable, berries, alfalfa, etc. The depth of water applied on the land in irrigation varied from one to two feet annually, depending upon whether the soil was heavy or light or sandy. (Case of Clough vs. Spring Valley Water Works, Testimony of Jos. C. Shinn, Transcript on Appeal, pp. 520-28; testimony of E. A. Ellsworth, pp. 1346-73, etc.) It was not the universal custom to irrigate, some thinking it necessary and some not. The latter was particularly the case in wet years. (Ibid, Testimony of Wm. Barry, p. 500, and others.)

The Spring Valley Water Company, in order to divert all of the low water flow of Alameda Creek at the "stone-chute", was under the necessity of controlling or acquiring the water rights of the Washington and Murray Township Water Company. The method pursued was to acquire the capital stock of the company. The authorized capital stock of the company was 50,000 shares, of which 38,810 shares were issued (Minutes of W. and M. W. Co., August 7, 1876, Transcript of testimony, case of Clough vs. Spring Valley Water Works, pp. 1777-79). At the date of trial of the case of Clough vs. Spring Valley Water Works, November 1901, 32,610 shares were issued and outstanding (Finding VIII., p. 252, Transcript on Appeal), 6,200 shares having been forfeited and reverted to the company. The Spring Valley Water Works has acquired the outstanding stock as follows, according to Findings of Fact VIII. in the case of Clough vs. Spring Valley Water Works (Transcript on Appeal, p. 252-9), the Spring Valley Water Company's Detailed Statement of Permanent Improvements, including cost of real estate and new construction, June 30, 1903, to May 1, 1912, filed with the Board of Supervisors, June 11, 1912, and other information available to me.

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Date acquired	Transferred to the name of	No of shares
June 25, 1875	Charles Webb Howard (Aug. 3, 1876)	25,000
Aug. 15, 1888	Wm. Brooks	200
Aug. 15, 1888	Charles Webb Howard	200
Apr. 30, 1891	S. V. W. W.	2,600
Dec. 20, 1892	S. V. W. W.	2,560
Feb. 14, 1902	Charles Webb Howard	100
Oct. 22, 1909	Unknown	1,000
May 17, 1910	Unknown	750
Total		32,610

The shares transferred to individuals were held for the company and in a number of instances held by the company have subsequently been transferred to company officers or employees. The acquisition of the first block of stock in 1875 enabled the Spring Valley Water Works to control the officers and operations of the Washington and Murray Township Water Company. The Spring Valley Water Works apparently did not exercise this power, however, until August 6, 1888, at about the time the Alameda Creek diversion across the Bay was initiated. Subsequent to that date the Spring Valley Water Works elected its own officers and employees as directors and officers of the Washington and Murray Township Water Company, and at times, beginning August 10, 1888, diverted water formerly diverted by the latter company. (Findings of Fact IX. and X. in case of Clough vs. Spring Valley Water Works, Transcript on Appeal, pp. 266-73.) The minority stockholders brought suit against the Spring Valley Water Works, December 1, 1898, petitioning that the rights of both companies be defined and that the Spring Valley Water Works be perpetually enjoined from diverting so as to interfere with the rights of the company. The Superior Court decision rendered February 23, 1904, defined the rights as petitioned, finding the rights of the Washington and Murray Township Water Company to be as stated above, and perpetually enjoining the Boards of Trustees of Washington and Murray Township Water Company and the Spring Valley Water Works from diverting the natural flow of the Alameda Creek owned by Washington and Murray Township Water Company. The decision was appealed to the Supreme Court by the Spring Valley Water Works on March 5, 1904. The case was finally closed by a compromise settlement made with Mrs. Jane R. Clough, May 17, 1910.

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All expenses of the Washington and Murray Township Water Company for construction of its ditch, operation, etc., were paid by assessments on stock and water rentals. The total assessment on each share of stock up to August 2, 1875, was 28 cents (Minutes of W. and M. T. W. Co., Transcript of Testimony, case of Clough vs. Spring Valley Water Works, p. 1769). The last assessment was levied in 1887 (Minutes W. and M. T. W. Co., Aug. 1, 1887, Ibid, page 972) and the total had reached 63 cents per share. (Case of Clough

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vs. S. V. W. W., Testimony of W. K. Yates, Trans. on Appeal, p. 1043.) The gross sum realized from assessments was approximately \$21,000 (Ibid. p. 1043). The testimony of the company's stockholders in the Clough case shows that the Washington and Murray Township Water Company was never a very successful financial enterprise, I believe largely on account of the divided opinion among the land owners as to the value of irrigation. That this divided opinion is not based solely on the former customs of the local people is indicated by the opinion of Mr. F. W. Roeding, formerly Irrigation Manager of the Irrigation and Drainage Investigations of the United States Department of Agriculture and now manager of the Agricultural Department of the Spring Valley Water Company. Mr. Roeding states in discussing the conditions on Niles Cone ("The Future Water Supply of San Francisco", by Spring Valley Water Company, 1912, p. 265) "that irrigation has not and never has been, a general practice and never will because of climatic conditions and characteristics of the soil." I therefore assumed that the Washington and Murray Township Water Company had no value above the accumulated assessments.

Questioned by Master.

It is my understanding, from reading the detailed testimony in the case of Clough vs. Spring Valley Water Works, that this stock which was owned in this company was not paid for except in the way of assessments. As I understand it, the stock was issued without an initial payment, and then assessments were levied on the stock as money was needed for extending the ditch, or as they were not sufficient to meet the expense.

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DIRECT EXAMINATION BY MR. SEARLS.

The cost to the Spring Valley Water Works of acquiring the Washington and Murray Township Water Company stock would, under this assumption, be represented by assessments on stock owned by it both before and after purchase, as follows:

Date stock issued to S. V. W. W.	No. of shares	Assessments prior to purchase	Assessments subsequent to purchase
June 25, 1875	25,200	See "Calaveras purchase"	\$8,820
Aug. 15, 1888	400	\$ 252	0
Apr. 30, 1891	2,600	1,638	0
Dec. 20, 1892	2,560	1,613	0
Feb. 14, 1902	100	63	0
Total		\$3,566	\$8,820

In addition to this, the Spring Valley Water Works paid \$500 for general expenses of the company after the last assessment was levied. (Testimony of W. A. Yates in case of Clough vs. S. V. W. W., Transcript on Appeal, p. 1043.)

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There was also the purchase of the 1,000 shares, October 22, 1909, for \$5,250 (Detailed Statement of Permanent Improvements, including cost of real estate and new construction, June 30, 1903, to May 1, 1912, filed with Board of Supervisors, June 11, 1912, by S. V. W. Co.); the payment of \$46,000 to Jane R. Clough, May 14, 1910, for compromise of the case of Clough vs. S. V. W. W. and 550 shares of stock held in the name of Jane R. Clough and Wm. R. Ford; and the payment of \$5000 to Jane R. Clough for 200 shares of stock held in the name of Howard Overacker. (Entry on p. 143, Cash Book No. 6, S. V. W. Co.) The expenses of Jane R. Clough in the case of Clough vs. S. V. W. W. were \$44,765 (Finding XXV., p. 352 of transcript of testimony). The amount paid for the 550 shares of stock could not in my opinion exceed the difference between this amount and \$46,000 or \$1,235.

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Questioned by Mr. Greene.

The total amount paid Mrs. Clough was \$46,000 for closing the case. In the statement made in the Findings of Facts, her expenses were \$44,765. My idea was that the payment made to her of \$46,000 would reimburse her for the expenses she had undergone in the case; then in addition to that there were 200 shares of stock that were acquired with the closing of the case.

Questioned by Mr. Olney.

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The amount paid for the 550 shares of stock was not any greater than the difference between \$46,000 that was actually paid, and the amount of her expenses, \$44,765. It might have been less. My idea was that she desired reimbursement for the expenses she had gone to in the case.

Questioned by Master.

As I understand it, the company paid a certain amount for an assignment of judgment in the case, that amount being approximately \$44,765, or something a little greater. The difference between that and the total amount paid, as I understand it, might be considered as the amount paid for this extra stock. This \$46,000 represents the payment for the assignment of the judgment, plus 550 shares of stock. They paid \$46,000, and I allowed the \$46,000 later.

As part of the agreement with Mrs. Clough, the Spring Valley Water Company agreed to deliver to the tract of 50.53 acres owned by Mrs. Clough an additional 6,000,000 gals. per year not to exceed 100,000 gals. in 12 hours. The water was to be used for irrigation on the 50.53 acre tract only, and after 5 days notice. This quantity of water amounts to a depth of 0.53 feet annually on 35 acres, or 0.46 feet on 40 acres. The area of orchard irrigated on the Clough ranch from the Washington and Murray Township Water Co. ditch was between 35 and 40 acres and, in addition, other crops, such as berries, were irrigated. (Transcript on Appeal, Case of Clough vs. S. V. W. W., page 1208). The depth of water applied to the land

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9601 from the ditch was at least in excess of 1 foot. (Ibid. 521-8.) Hence the amount of water agreed to be delivered to the Clough tract is not in excess of the amount formerly obtained from the Washington and Murray Township Water Company ditch, and is considered by me as a reservation of a portion of the ditch right appurtenant to this land.

The total capital cost to the Spring Valley Water Company of acquiring complete control of the Washington and Murray Township Water Company water rights exclusive of the first cost of the 25,200 shares included in the "Calaveras purchase", I estimate as follows:

Total assessments on 5,660 shares stock bought August 15, 1888, to February 14, 1902.....	\$ 3,566
Assessments subsequent to purchase on 25,200 shares stock bought June 28, 1875.....	8,820
Amount paid by S. V. W. W. for general expenses of company after last assessment levied.....	500
Purchase price of 1,000 shares October 22, 1909.....	5,250
Purchase price of 550 shares May 14, 1910, and assignment of judgment in case of Clough vs. S. V. W. W.....	46,000
Purchase price of 200 shares May 14, 1910.....	5,000
Total	\$69,136

Questioned by Mr. Olney.

In getting at this total, I have included the \$46,000 which was paid for the 550 shares of the Washington and Murray Township Ditch Co., and I have excluded any burden because of the agreement to deliver Mrs. Clough 6 million gallons a year for irrigation on her land. I have excluded that upon the theory that she was entitled previously to at least that amount of water through the ditch; in other words, I considered that that portion of it was a mere substitution for her ditch right. My understanding of her ditch right, from a legal standpoint is that it is the use she has made of the water. I did not understand as a result of the study I made of the Clough case that Mrs. Clough's right to water through this ditch was dependent upon her ownership of stock in the Ditch Company.

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DIRECT EXAMINATION BY MR. SEARLS.

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Summary for Alameda Creek: The total cost of water rights based on prior use, which the Spring Valley Water Works acquired on Alameda Creek is estimated by me as follows:

Cost of water rights obtained by Alameda Water Co. purchase.....	\$892,694
Cost of acquiring W. and M. T. W. Co. rights exclusive of stock included in Alameda Water Co. purchase.....	69,136
Total	\$961,830

PILARCITOS CREEK.

Spanish Town Mill Power Right. This purchase consisted of a grist mill at Spanish Town (or Half Moon Bay) and two acres of riparian land upon which it stood, together with the right to divert the flow of the creek as a motive power for operating the mill. The property was purchased from M. R. Halsted, February 25, 1861, for \$6,000 subject to a mortgage of \$3,000 in favor of the company (Minutes Spring Valley Water Works, February 21, 1861, and March 1, 1861.) The property without the water rights was sold to Ames and Denniston, June, 1863, subject to the same mortgage in favor of the company in exchange for relinquishment by Ames and Denniston of all their water rights on Pilarcitos Creek. The amount of the mortgage, \$3,000, was paid by Denniston and Ames, August 24, 1864 (Minutes Spring Valley Water Works, February 21, 1861, June 4, 1863, and August 24, 1864.) The mill property thus cost the company \$6,000 cash, in exchange for which, with water rights reserved, the riparian rights of Ames and Denniston on the creek were obtained. The combined cost of the mill water right and Denniston and Ames riparian rights have been listed under the Halsted purchase on Table 1.

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Miscellaneous. An item of \$20,000 for water rights on Pilarcitos Creek paid H. A. Hilm, 1864, occurs in the Municipal Record for 1900-01, Water Rates, p. 31, Exhibit 2 of Spring Valley Water Works, "Showing cost of property known as Pilarcitos Lake." No description of this item can be found in any of the available records. It is included here as a part of the water right cost in the absence of information to the contrary.

SAN MATEO CREEK.

San Mateo Water Works. This company was incorporated December 11, 1874, for the purpose of securing such waters as the company might require and distributing and selling the same to the inhabitants of San Mateo County for agricultural and mechanical purposes (Cal. Supreme Court Records, Vol. 1185, p. 52. Case of Spring Valley Water Works vs. San Mateo Water Works, et al.) The grantor of the San Mateo Water Works, Alvinza Hayward, had, since 1869, been continuously engaged in the construction and maintenance of the system. (Ibid. pp. 56 and 61.) The latter consisted of two small storage reservoirs in the Crystal Springs Valley now flooded by the Crystal Springs Reservoir, a distribution reservoir above the town of San Mateo, water mains from its storage reservoirs to the distribution reservoir and from the latter to San Mateo, and service pipes throughout the principal streets of the town. (Ibid. 56a, 75, etc.) The main supply of the San Mateo Water Works was catchment water accumulated in the "Hayward Reservoir" on lower San Andreas Creek. (Ibid. pp.

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75 and 136). The actual cost of the works exclusive of real estate was \$158,343.69 up to November, 1879. (Ibid, p. 144a). The company also acquired, December 21, 1874, five tracts of land from Alvinza Hayward which on that same date had been deeded to Hayward by James Byrnes. (Ibid, pp. 143a, 129). These tracts lay partially in the valley bottom and partially on the slopes and ridges, the total area being 964.93 acres. (Ibid. pp. 129a, 184). Byrnes deeded these lands to Hayward for \$60,000 (Ibid. pp. 127a, 129), or \$62.30 per acre. The population of the town of San Mateo at the date of trial of the case of Spring Valley Water Works vs. San Mateo Water Works, November, 1879, was about 1200. (Ibid. pp. 61a, 65).

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The Spring Valley Water Works, in order to construct the main Crystal Springs Reservoir, was under the necessity of acquiring the real estate of the San Mateo Water Works in the Crystal Springs watershed and valley, including its small reservoir. This it accomplished by purchase, October 3, 1883. (Deed of San Mateo Water Works to Spring Valley Water Works). The purchase included ten parcels of land totaling 980.04 acres above Crystal Springs Dam and the two small reservoirs in the Crystal Springs Valley, but not the 5- and 6-inch pipe lines between the Hayward Reservoir in Crystal Springs Valley and the distributing reservoir, and between the latter and the distribution systems. The Spring Valley Water Works also agreed to deliver to the distribution reservoir of the San Mateo Water Works, in perpetuity, 300,000 gallons per day from Crystal Springs Lake or elsewhere. (See Deed). The latter I have assumed constituted a reservation by the San Mateo Water Works of the developed water rights which it had acquired by use. This assumption would seem to be borne out by the fact that the water was delivered to the same distributing reservoir previously used by the San Mateo Water Works. I also note that Mr. C. E. Grunsky in his testimony in this case (p. 1213) has regarded the developed rights of the San Mateo Water Works as offset by the obligation of the Spring Valley Water Works. In my opinion no water rights were acquired by the Spring Valley Water Works in this purchase other than the riparian rights which went with the land and were included in the value of the land.

LAKE MERCED.

The Clear Lake Water Company and Lake Merced Water Company were organized at some time prior to June, 1868, for the purpose of condemning the land embracing Lake Merced (Minutes Spring Valley Water Works, September 1, 1868). The Clear Lake Water Company was organized with a capital stock of 20,000 shares and the Lake Merced Water Company 4,000 shares, all of which was issued. (Minutes Spring Valley Water Works, September 1, 1868). The ultimate purpose of the companies was probably the introduction of

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a supply of water into San Francisco from this source. There were a great number of conflicting claims to the lands surrounding the lake and the only mode of securing the lands was by condemnation. (Minutes of Spring Valley Water Works, September 1, 1868). I have been unable to ascertain definitely whether the companies acquired any property or rights at Lake Merced prior to the purchase by the Spring Valley Water Works. The companies could not have been developing or delivering water as the condemnation proceedings were still in progress as late as 1873. These proceedings were evidently carried on by a commission appointed by the Court, for the Minutes of the Spring Valley Water Works, April 1, 1873, contain the entry that the "Lake Merced Commission" had made its report, and on May 1, 1873, that the Court had set aside the award of the Lake Merced Commission with leave to refer the matter to a new Commission.

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The Spring Valley Water Works purchased the entire capital stock of these two companies, August 3, 1868, for \$150,000 (Municipal Report, 1900-01, Water Rates, p. 24; and Minutes of Spring Valley Water Works, September 1, 1868). The purchase, as entered on Exhibit No. 1 of the Spring Valley Water Works is the rate hearing before the Water Rates Committee of the Board of Supervisors in 1901 (Municipal Report, 1900-01, Water Rates, p. 24), appears as a purchase of "water rights". The testimony of Pelham Ames before the Board of Supervisors in 1902 (Water Rates testimony, 1901-02, p. 44-6) is to the effect that no land was included in the purchase, only the water rights of the company, "whatever that was, I don't know." The testimony of Wm. Brooks for the Spring Valley Water Company in the 1904-5 rate case (p. 3180 of testimony) contains the statement that the interests of the Clear Lake Water Company "consisted of that 5-chain strip and some franchises and rights which I am not well posted on, and I think also some 50 acres on the North Lake just outside the ranch." It thus appears that no very definite information is available regarding this purchase even to the Spring Valley Water Company. In order not to omit any item which could properly be charged to water rights, however, the writer includes the purchase price of the Clear Lake Water Company and Lake Merced Water Company as part of the original cost of water rights.

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Summary of water rights based on use. The data on cost of water rights, based on past use, as acquired by Spring Valley Water Works, may be summarized as follows:

Alameda Creek	\$ 961,830
Pilarcitos Creek	20,000
San Mateo Creek	
Lake Merced	150,000
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Total	\$1,131,830

IV. COST OF UNDERGROUND WATER RIGHTS.

The only developed underground water source now drawn upon by the Spring Valley Water Company is in Livermore Valley at the Pleasanton Wells. This source consists of a definite basin or "underground reservoir," underlying a portion of the floor of Livermore Valley. The basin is formed, broadly speaking, by the relatively impervious rock formations which compose the hills surrounding the valley, and is filled by a large body of very porous gravels. The voids in the gravel are filled with water which is derived by percolation from the streams flowing out from the hills on to the surface of the gravel, from slow seepage from the hill slopes and by percolation from the direct rainfall upon the gravel surface. The principal supply is the flow of Arroyo Valle and Arroyo Mocho during the rainy season.

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That portion of the gravel basin occupying the lower portion of the valley from the narrow contraction opposite the Hearst property, northward to a line drawn approximately parallel and somewhat north of Arroyo Mocho Canal, and eastward to a line drawn northeast from the contraction and through Pleasanton, is blanketed by a layer of impervious clay. This clay cap, which is approximately 30 feet thick, together with the surrounding hill formation, forms a pocket or pouch. Water entering this pouch from the uncapped gravels higher up the valley, becomes entrapped and has no natural outlet but by leakage through the clay cap. Such leakage formerly occurred as springs issuing at the surface through fractures in the clay cap, and from a slow upward percolation or sweating through the clay. This escaping water formed a large lagoon and swamp in the valley north and west of Pleasanton. The water was to a large extent dissipated by evaporation and transpiration although a portion probably found its way into Laguna Creek at certain times of the year. The water beneath the clay cap was under pressure from the water in the gravel at higher elevation further up the valley and artesian conditions existed.

The initial development of the Spring Valley Water Company near Pleasanton consisted of drilling a large number of wells through the clay cap and into the gravels. This punctured the lining of the pocket and allowed water to flow freely out on to the surface and off into Laguna Creek. In more recent years the output of the wells has been stimulated by pumping operations. This well development, together with the drainage operations of local land owners resulted in the almost complete disappearance of the lagoon and swamp.

The effect at any time of opening the wells and starting pumping operations at the Spring Valley plant is felt; first, by immediate reduction of artesian pressure and reduced flow from other artesian wells within the area covered by the clay cap; and second, by a continued gradual reduction of flow and water level in wells within the artesian area, and a gradual but more rapid lowering of water level

in wells in the open gravel basin to the east of the artesian area. The latter area is the absorbing ground and storage reservoir from which water feeds into the artesian basin. Each year, if winter run-off conditions are favorable, this reservoir fills up, raising the water level in wells throughout the valley and increasing artesian pressure beneath the clay cap. The Spring Valley Water Company draft upon the Pleasanton wells during the summer, fall and early winter of each year, depletes the reservoir, lowering water levels and decreasing artesian pressure as above explained.

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Restricted rights to develop underground water in Livermore Valley have been acquired by Spring Valley Water Company; first, through agreement with Mrs. P. A. Hearst with regard to her property along Laguna Creek as affected by the company's pumping operations; second, by purchase of the so-called Pleasanton Well tracts and Pleasanton Ranch lands; and third, by agreement with J. J. Scrivner and Grant Gravel Company relative to properties along Arroyo Valle east of Pleasanton. The rights thus acquired cover the lower end of the area affected by the company's well developments, including most of the artesian or "clay cap" area, but do not cover the upper portion east of the clay cap. Careful study of well records by me indicates that it is in the latter portion of the valley that the effect of long-continued draft from Pleasanton wells is most pronounced. The right of the company to lower the water planes in this area, I understand, is not recognized by the local land owners. The Pleasanton Water District, recently organized by land owners in the Livermore Valley is actively opposing the right of the company to drain water from beneath lands not owned by the company. This agitation seems to have been the outcome of the pumping operations carried on during the dry years 1912 and 1913. The company has been endeavoring to draw up an agreement with the land owners in the valley relative to the matter. There is ample basis for the conclusion that the company's right to develop subterranean water in Livermore Valley was not complete during the period under consideration in this case.

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HEARST AGREEMENT.

The Hearst Ranch, in Livermore Valley, lies about two miles southwest of Pleasanton and embraces the throat of the valley at its outlet and the hill slopes to the west. It is crossed by Laguna Creek and includes the southerly extension of the Livermore Valley gravels from which the company's Pleasanton wells derive their supply. There are four wells penetrating the Livermore Valley gravels on the Hearst property from which prior to the date of the agreement, April 29, 1911, water was derived for domestic and irrigation uses on the property. (Deed, p. 4).

By the terms of the agreement the Spring Valley Water Company is to deliver water to the property whenever the water level in any one of the four Hearst wells falls below 15 feet from the top of a concrete monument set in the ground near one of the wells. (The elevation of the top of the monument is 310.42 feet above sea level). (Deed, p. 8). The company also agrees to construct and maintain two underground covered cisterns with delivery pipe connections at a specified location on the property, one of 900,000 gallons capacity and one of 1,500,000 gallons capacity and to deliver water to these reservoirs whenever the terms of the agreement require. The maximum to be so delivered in any one day is limited to 2,000,000 gallons, and in any year to 90,000,000 gallons. (Deed, pp. 5-7). It is also specified that not more than 30,000,000 gallons shall be delivered annually to the smaller cistern and that this water shall be extracted by pumping from the gravels of Livermore Valley, and shall be suitable for domestic use. Water delivered to the larger cistern is to be suitable for irrigation. (Deed, p. 7).

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The owner of the Hearst property, on her part, agrees not to object to the withdrawal by the company of either surface or subterranean water from lands in Livermore Valley or its tributary drainage area, and grants the company the right to withdraw such waters as long as the terms of the agreement are fulfilled. The agreement expressly states, however, that the owner of the property does not surrender her rights in the event of failure of the company to meet its obligations. (Deed, p. 11).

By an amended agreement dated April 25, 1912, the company was allowed to delay the construction of the reservoirs until written notice was served, provided the company supplied water as needed. One reservoir of about 900,000 gallons capacity, with connections to the Spring Valley pipe line was constructed in 1913.

As far as I have been able to ascertain, there was no cash payment to Mrs. Hearst in connection with this agreement. The cost of pumping water delivered to the property and the cost of pipe line maintenance and operation, I understand, are included in the company's general operation expense and allowed by the city. Similarly, the capital cost of the one cistern with connections is included in the city's reproduction value of the property. Hence, this agreement is not represented by any item of capital cost to the company, or of current expense for which the company is not reimbursed.

PLEASANTON LAND PURCHASES.

The Pleasanton land purchases embrace 5609.61 acres in the floor of Livermore Valley, southwest, west and north of the town of Pleasanton. These lands are customarily grouped as the Pleasanton Well Tracts and the Pleasanton Ranch lands. The first group comprises an area of 951.66 acres and was purchased between 1899 and 1902. The

second group has an area of 4657.95 acres and was purchased in 1911. The Pleasanton Well Tracts are the site of the Pleasanton Wells and are used by the company for pumping operations. Wells north of County Road No. 2000 were not used prior to 1912 and the well tracts in use prior to that date are considered as bounded on the north by this road. Since 1912 the well tracts are considered as bounded on the north by Arroyo del Valle. The Pleasanton Ranch lands are not used by the company in connection with water development, the necessity for acquiring at least a portion of them having evidently been the objections of the owners to pumping operations by the company which affected the water plane under these lands. I understand that the company has leased or is farming practically all of the Pleasanton lands.

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The cost of the well tracts south of County Road No. 2000 should not appear as a charge against water rights and the cost of the well tracts north of the county road since and including the year 1912 should not appear as a charge against water rights. The lands are in use by the company in connection with water development structures and operations, and the writer is informed are included in the city's land appraisal as in use.

With regard to the Pleasanton Ranch lands and well tracts north of County Road No. 2000 prior to 1912 a different situation is presented. These lands are not used by the company for water development purposes. The only purpose which they serve is to enable the company to fluctuate at will the water plane beneath them. The lands are of value for agricultural purposes as evidenced by the fact that they are being rented for this purpose and crops are being raised. In some instances, in fact, they are benefitted by the company's operations through drainage as the result of relief of artesian pressure. The company could, in my opinion, sell the Pleasanton Ranch lands with a reservation of the right to fluctuate the water plane beneath them, without in any way endangering the quality of the water or the present or future right to operate the Pleasanton pumps.

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The sale value of these lands with the company's pumping operations in effect, but not considering the benefit derived from drainage, would be less than their value if the company was not drawing water from the gravels. The difference in value would be represented by the damage done to the land by the company's operations. The aggregate of such differences for the ranch lands would, in my opinion, represent the portion of the first cost of these lands chargeable to water rights. Similarly, the damage to the well tracts north of County Road No. 2000 represent the portion of the cost of these lands chargeable to water rights prior to 1912.

The damage resulting from the operation of the Pleasanton pumping plants consists: first, of the reduction or total failure of flow of

artesian wells within the former artesian area; and second, the lowering of water level in pumped wells. The financial damage may be computed in the first case by adding to the cost of necessary pumping equipment the capitalized cost of pumping. In the second case, it is the increased cost of pumping equipment plus the increased capitalized cost of pumping. The total damage to ranch lands as estimated by me in Appendix A of this report is \$102,900, and to the well tract north of County Road No. 2000 prior to 1912, \$14,500.

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Appendix A describes in detail how the estimate was made, and the data upon which it is based, and it gives tables of data and maps showing the position of the water planes in the valley at different dates with reference to the Spring Valley tracts. It also has a diagram showing fluctuation of water in a well in the valley near Pleasanton. That data was obtained from records in the Cyril Williams, Jr., report. The water levels upon which these maps are based are those obtained both by the city and by the Spring Valley Water Co., and were obtained from records compiled in the office of the City Engineer.

OTHER AGREEMENTS.

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The Spring Valley Water Co. entered into an agreement with J. J. Scrivner on June 27, 1913, relative to the latter's subterranean water rights on a tract of 100 acres in Livermore Valley about two miles east of Pleasanton. By the terms of the agreement, Scrivner agrees not to object to the pumping operations of the Spring Valley Water Company in Livermore Valley nor to claim damages for injury to his land resulting from such operations. In return the company paid \$1,850 cash and in case the water level in the 10-inch well on the tract ever lowered below a depth of 60 feet agreed to deliver water on the tract at a rate of 350 gallons per minute for 12 hours per day continuously for at least 14 consecutive days, the total so delivered, together with water used in irrigation from other sources, not to exceed one acre foot per acre per annum. I understand the company has not been called upon to make such deliveries as yet. The only cost involved at present is the cash payment.

An agreement was also made with the Grant Gravel Company on this same date. The latter company by the terms of the agreement subordinated the surface and underground water rights to which it had title on two parcels of land to the rights of the Spring Valley Water Company to carry on pumping operations on any other land in Livermore Valley. The Grant Gravel Company has the privilege of withdrawing water from the two parcels for domestic or business use, but if the Spring Valley's operations on other lands should make this impossible the Gravel Company agrees to subordinate its rights to those of the Spring Valley. The two tracts are located along Arroyo Valle about two miles east of Pleasanton, and contain 11.22 and 85.09

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acres respectively. The Spring Valley paid for this privilege and for the right to lay a pipe line across the property the sum of \$17,500.

Summary of underground water rights. The data on cost of underground water rights, as acquired by the Spring Valley Water Company may be summarized as follows:

Hearst agreement	\$,000	9618
Pleasanton Ranch lands.....	102,900		
Pleasanton Well tract (North of County Road 2000)	14,500		
J. J. Scrivner agreement.....	1,850		
Grant Gravel Co. agreement.....	17,500		
<hr/>			
Total (ex. Well tract N. of County Road 2000)	\$122,250		

V. RECAPITULATION OF ESTIMATED ORIGINAL COST.

The total estimated original cost up to date of December 31, 1913, is as follows:

Alameda Creek			
Riparian rights.....	\$384,978.13		
Water rights based on use and indefinite.....	961,830.00		
			1,346,808.13
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Livermore Valley			
Underground water rights, Dec. 31, 1913.....			122,250.00
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Lake Merced			
Indefinite	150,000.00		150,000.00
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Pilarcitos Creek			
Riparian rights.....	14,100.00		
Indefinite	20,000.00		
			34,100.00
<hr/>			
San Mateo Creek			
Riparian rights	187,783.60		187,783.60
<hr/>			
Total			\$1,840,941.73
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Add 5% for items omitted and overhead not taken care of in operation.....			92,047.09
<hr/>			
Grand total.....			\$1,932,988.82

The last item of 5 per cent to cover items omitted and overhead not taken care of in operation has been added to the total estimated original cost in order to eliminate all uncertainty with respect to the completeness of cost records. Most of the overhead expenses in connection with the acquisition of water rights such as the compensation of the purchasing agent, legal expenses, etc., I believe were charged to current operating expenses. The 5 per cent is computed

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on the large items of the Lake Merced and Alameda Water Company purchases as well as smaller purchases. The percentage used is in my opinion large enough to amply cover all omitted items and overhead cost not otherwise taken care of.

The above estimate of the original cost of acquiring the water rights of the Spring Valley Water Company used in supplying the city and county of San Francisco with water is my best judgment of the actual amount, based on very careful study of all available records and the conditions on the ground.

The estimated original cost of water rights as of December 31, for the years 1907 to 1914, inclusive, is as follows:

Year	Estimated original Cost
1907.....	\$1,756,525.82
1908.....	1,756,525.82
1909.....	1,756,525.82
1910.....	1,766,301.32
1911.....	1,925,964.32
1912.....	1,912,671.32
1913.....	1,932,988.82
1914.....	1,932,988.82

ONE HUNDRED AND THIRTY-SECOND HEARING.

APRIL 6, 1916.

Witness: CHAS. H. LEE for Defendants.

9620

DIRECT EXAMINATION BY MR. SEARLS.

APPENDIX "A" TO "DEFENDANTS' EXHIBIT 189".

ESTIMATE OF DAMAGE TO SPRING VALLEY WATER
CO. LANDS IN LIVERMORE VALLEY, CALIFORNIA,
RESULTING FROM PUMPING OPERATIONS OF THE
COMPANY AT PLEASANTON WELLS.

By Charles H. Lee, Consulting Engineer.

The following summary of the physical conditions in Livermore Valley and estimate of damage to Spring Valley Water Co. lands resulting from the company's draft at Pleasanton wells has been made by the writer based on his personal investigations on the ground and a study of all available data.

The floor of Livermore Valley is underlaid by a subterranean lake or reservoir, formed by a large body of very porous gravels filling a deep basin in the relatively impervious rock formations which compose the hills surrounding the valley. This gravel contains large quantities of water in the void spaces between the particles of sand and gravel. The water is derived by percolation from the streams flowing out from the hills on to the surface of the gravel, from slow seepage from the hill slopes and by percolation from direct rainfall upon the gravel surface. The principal supply is from the winter and spring flow of Arroyo Valle and Arroyo Mocho.

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That part of the gravel basin occupying the lower portion of the valley from the narrow contraction opposite the Hearst property, northward to a line drawn approximately parallel and somewhat north of Arroyo Mocho Canal, and eastward to a line drawn northeast from the contraction and through Pleasanton, is blanketed by a layer of impervious clay. This clay cap, which is approximately 30 feet thick, together with the surrounding hill formation, forms a pocket or pouch. Water entering this pouch from the uncapped gravels higher up the valley, becomes entrapped and has no natural outlet but by leakage through the clay cap. Such leakage formerly occurred as springs issuing at the surface from fractures in the clay cap, and from slow upward percolation or sweating through the clay. The escaping water, not dissipated by evaporation and transpiration, formed a large lagoon and swamp in the valley north and west of Pleasanton. Some of this water ultimately found its way into Laguna Creek, particularly in the period of greatest pressure in the spring of the year. The water be-

neath the clay cap was under pressure from the water in the gravel at higher elevation further up the valley and artesian conditions existed.

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The initial development of the Spring Valley Water Company near Pleasanton consisted of drilling a large number of wells through the clay cap and into the gravel. This punctured the lining of the pocket and allowed water to flow freely out on to the surface and off into Laguna Creek. In more recent years the output of the wells has been stimulated by pumping operations. This well development, together with the drainage operations of local land owners resulted in the almost complete disappearance of the lagoon and swamp.

The effect at any time of opening the wells and starting pumping operations at the Spring Valley plant is felt: first, by immediate reduction of artesian pressure and reduced flow from other artesian wells within the area covered by the clay cap; and second, by a continued but gradual reduction of flow and water level in wells within the artesian area, and a gradual but more rapid lowering of water level in wells in the open gravel basin to the east of the artesian area. The latter area is the absorbing ground and storage reservoir from which water feeds into the artesian basin. Each year, if winter run-off conditions are favorable, this reservoir fills up, raising the water level in wells throughout the valley and increasing artesian pressure beneath the clay cap. The Spring Valley Water Company draft upon the Pleasanton wells during summer, fall, and early winter of each year, depletes the reservoir, lowering water levels and decreasing artesian pressure as above explained. During the winters of deficient run-off, very little replenishment of the reservoir occurs and the accumulated depletion of two successive years results in marked lowering of the water plane.

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The reduction of artesian pressure resulting from the Spring Valley operations has been a benefit to a portion of the overlying land for the reason that land which formerly was swampy and worthless for agriculture has drained out and can be profitably cultivated. This benefit has been accomplished jointly, however, by the operation of the Spring Valley Water Company wells and the drainage work done by the Alameda Sugar Company and Pleasanton Hop Company, and it is impossible to separate the effect of these two influences. There is also in all probability land which was formerly sub-irrigated which now does not receive water from below in sufficient quantities to materially assist field crops under present conditions. This latter may be considered in the aggregate as partially balancing the benefits due to relief of artesian pressure.

The damages to overlying land as a result of the Spring Valley Water Company well development consist: first, of the reduction and, at certain times, total failure of flow of artesian wells within the former artesian area, necessitating the installation of pumping equipment

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and more or less continued expenditure for operation of same; and second, the lowering of water level in pumped wells, resulting possibly in change of equipment and certainly in greater operation expense.

After a brief detailed description of the Spring Valley Company well development, this damage will be analyzed and computed.

The first development by the Spring Valley Water Company in Livermore Valley was the drilling of wells southwest of Pleasanton in the fall of 1898.

There were fifty-three flowing wells drilled in the A, B, C, D and E lines, which at elevation 315 discharged into a ditch which conveyed the water to Laguna Creek, and thence to Alameda Creek, where they were diverted at the Niles Dam. In the fall of 1901 the flow was increased by cutting a trench 20 feet deep connected to the C-line of wells, which allowed the latter to discharge at elevation 302 feet and flow thence through a tunnel to Laguna Creek, and thence to Sunol filter gallery. In the summer of 1902 the flow was again increased by the installation of a siphon connecting with a number of C-line wells delivering to the tunnel. In 1909 the losses in Laguna Creek and necessity of filtering at Sunol were eliminated by installation of a 12 million gallon daily centrifugal pump at the sump near the siphon shaft and the construction of a 30" pipe direct to the filter gallery at Sunol. In 1911 the siphons and sump were abandoned and the pump suction connected direct to the C-line wells and the 30" pipe. In November, 1912, an air lift pumping plant was installed on the C-line of wells and water carried in a 20" pipe to pump No. 1 on the C-line, where connection was made with the 30" pipe. In July, 1913, the N-line of wells was connected with an air lift system and a second centrifugal pump installed to deliver water from the C and N-lines to the 20" pipe.

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Table 1 presents data as to the measured seasonal, average daily, and maximum daily draft by the Spring Valley Water Company from Livermore Valley gravels at Pleasanton wells since the wells were first drilled. There has been a gradual increase in the seasonal draft during the sixteen years of use. The largest draft has apparently occurred during years of deficient rainfall and stream flow, such as 1912-13. The average draft during the past three seasons has been 2,296 million gallons per year. The season 1912-13, with 2,745 million gallons, represents maximum draft conditions for this period. The maximum daily draft of 11.4 million gallons per day occurred in the season 1913-14. The average maximum daily draft for three seasons prior to this season was 8.7 million gallons per day. The company has made the following land purchases in connection with the operation of the Pleasanton pumping plant:

1. The Pleasanton Well tracts, embracing lands southwest of Pleasanton and south of Arroyo Valle and Rose Canal, upon which the

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wells and pumping plants are located. (Map 3). This land comprises 951.66 acres and was purchased from sixteen individual owners during the period, August 4, 1899, to December 22, 1902. The tracts all overlie the artesian basin, and are now all used in connection with the operation of the Pleasanton pumping plant. Lands north of County Road 2000 were not used in connection with the operation of the land prior to 1912.

2. The Pleasanton Ranch lands, embracing most of the valley floor northwest and north of Pleasanton (Map 3). A number of these purchases, I understand, were made in order to avoid impending litigation initiated by the owners of lands adjacent to the Pleasanton Well tract, whose flowing wells were interfered with by the operation of the Spring Valley wells. Other purchases were probably made with the idea of avoiding future litigation and for proposed additional well developments. The land comprises 4657.94 acres, and was purchased from approximately 21 owners during the period, April 1, 1911, to March 25, 1912. A large portion of these lands overlie the artesian basin, and the ground-water level in wells is affected by the Spring Valley pumping. The portion lying along the north edge of the valley is on the edge and outside of the flowing well area, and is not materially affected by the Spring Valley pumping. (See Map 3 showing lines of equal lowering due to Spring Valley pumping at Pleasanton.)

Damages to overlying land owned by the Spring Valley Water Co. resulting from the company's operations have been computed by me for the so-called Pleasanton Ranch lands now owned by the company, and the well tracts north of County Road 2000 prior to 1912. The Pleasanton Well Tract south of County Road 2000 is excluded because, as I understand, this is included by the city at full value in the land appraisal as used and useful real estate.

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The present local use of water in Livermore Valley is mostly for domestic and stock purposes. There are very few irrigation pumping plants. The valley and surrounding slope lands are capable of irrigation, however, and would in all probability have greater productivity if irrigated. At no far distant date irrigation will undoubtedly be extensively practiced for certain crops, in which event the logical source of supply would be from wells on individual tracts. It will therefore be assumed in computing damage that water is to be developed in quantities sufficient for irrigation of overlying land. The damage within the flowing well artesian area consists at most of total failure of flow of artesian wells, necessitating installation of pumping plants and continued operation expense. The damage in the non-flowing well artesian area and in the non-artesian area consists of lowering the water level in wells, necessitating increased operation expense and possibly increased fixed charges on more expensive pumping plant installation or deeper well.

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The following cost data is used by me:

1. The operating cost of raising one acre foot of water one foot high for lifts from 12 to 140 feet, as averaged from various tests by the United States Government, principally in Santa Clara Valley, averaged 7 cents (Buls. 158, 236 and 254, Office of Exp. Sta., U. S. D. A.).

2. The fixed charges for mixed farm pumping plants are about 14% of first cost, as follows: Interest 6%; repairs and maintenance 2%; and depreciation and renewal 6%. (Circular 117, Univ. of Calif., Agricultural Exp. Sta., p. 24).

3. The cost of 12-inch stove pipe casing wells may be taken at \$2.00 per foot, including casing, for first 100 feet and \$2.50 for second 100 feet.

4. The capital cost of installing pumping equipment on artesian wells which have ceased flowing is estimated as follows: 9627

1/7 1/2 H.P. electric motor with belt and pulley..	\$146.50
1/4-inch horizontal centrifugal pump (700 g.p.m.)	67.50
Pump pit 5 ft. x 6 ft., 10 ft. deep at \$5.00.....	50.00
Installation, housing, etc.....	100.00

Total	\$364.00
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Acreage served—45.

Cost per acre	\$8.10
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Fixed charges per acre at 14%.....	1.14
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5. The additional capital cost of pumping equipment on wells in non-flowing well tracts where maximum pumping lift increased from 30 ft. to 40 ft. and 40 ft. to 50 ft.:

Increased depth of pit 20 ft. to 30 ft., 10 ft., at \$5.00..	\$50.00
Exchange of 7 1/2 H. P. motor for 10 H.P. motor.....	45.00

Total	\$95.00
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Per acre	2.11
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Additional fixed charges per acre at 14%.....	0.29
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The following physical data is available for Livermore Valley, which I regard as substantially reliable:

1. Map showing location of wells, prepared by City Engineer's Office. (Base for Maps 1, 2 and 3).

2. Measurements of depth to water level in approximately 107 wells, from July, 1911, to date, as made by Cyril Williams, Spring Valley Water Company, and City Engineer's Office, as tabulated by City Engineer's Office.

3. Measurements of depth to water level in Spring Valley well H-7 from January 1, 1899, to date, from records in office of City Engineer. (Fig. 1).

4. Data relative to Livermore Valley artesian area obtained by City Engineer's Office. (Table 4, 10th column).

9628 5. Logs of a number of typical wells as gathered and compiled by Spring Valley Water Company (The Future Water Supply of San Francisco, Appendix E), and on file in City Engineer's Office.

6. Tabulation (Table 3) of the Depletion and Replenishment of the sub-surface waters for the period of almost continuous pumping at Pleasanton wells, October 1, 1911, to December 9, 1913, as compiled from stream flow and pump records of Spring Valley Water Company, under direction of the City Engineer. This tabulation shows net depletion of gravels at end of each month during the period. Revision was made by me by reducing local draft from 2,000,000 gallons per day to 1,000,000 gallons per day and adding evaporation losses from moist land over artesian and gravel reservoir areas.

7. Study of soil evaporation from moist soil overlying artesian and gravel reservoir area, as per Appendix I, Future Water Supply of San Francisco, by Spring Valley Water Company, with adaptation to problem in hand. (Table 2).

The computation of lowering of water level in Livermore Valley resulting from the operation of Pleasanton Pumping Plant is based on the observed lowering resulting from net withdrawal of a known amount during the 800-day pumping period, October 1, 1911, to December 9, 1913. It was assumed that the difference in ground water level beneath any tract of land upon October 1, 1911, and upon the date at which the net withdrawal (considering draft, evaporation, etc.) was equal to the average annual Spring Valley draft, gave the lowering for that tract due to average Spring Valley operations. Similarly, the lowering due to Spring Valley operations during two consecutive dry years was determined.

The method which I followed is outlined in more detail as follows:

9629 1. The Spring Valley draft for typical years was taken by inspection from Table 1, as follows: Average draft, slightly more than the average of the past four years, 2,290 million gallons, two dry years, the sum of two consecutive years such as 1913, 5,500 million gallons. The latter is more severe than actually occurred during the two dry years 1912 and 1913.

2. The ground water contours for Livermore Valley were drawn for October 1, 1911, the beginning, and for December 9, 1913, practically the end of the 800-day pumping period, as indicated by the records of depth to water in wells which reach the gravels. (Maps 1 and 3). The water level of October 1, 1911, at well H-7 was 1.5 ft.

lower than the average maximum yearly level in this well since Spring Valley operations began in 1898 and is approximately the average yearly level at which pumping commences. The level of December 9, 1913, was the lowest since the Spring Valley operations began. (Fig. 1). The writer regards water level in well H-7 as being generally indicative of water plane fluctuations throughout the artesian basin.

3. The ground water contours were also drawn on the two dates, June 12, 1912 (Map No. 1), and March 22, 1913 (Map No. 2), when the net depletion of the Livermore gravels was 2,290 and 5,500 million gallons, respectively. (Dates obtained by inspection of Table 3).

4. Lines of equal lowering of the ground water surface due to depletion of the gravel reservoir of 2,290 and 5,500 million gallons, respectively, were drawn from the above contours. These were transferred to Map No. 3, which shows the tracts embraced in the Pleasanton Ranch lands. Upon this map were also placed ground water contours of December 9, 1913.

5. From the maps the following data for each tract was transferred to Table 4: average elevation of ground surface as shown by surface contours; elevation of ground water surface October 1, 1911; lowest elevation of ground water surface since Spring Valley draft began; and total lowering resulting from extraction of 2,290 million gallons and 5,500 million gallons, respectively. The ground water level at the beginning of the observed draft period being approximately the normal level at the date when the annual Spring Valley pumping draft commenced; the gravels being very open, so that the slope of the ground water surface quickly adjusts itself from the Pleasanton wells to the tight formation west of Livermore; and the depth of the gravels being great; it can be assumed, in my opinion, that the observed lowering resulting from the extraction of 2,290 million gallons and 5,500 million gallons, respectively, is equivalent to the lowering produced by the average annual and by two consecutive dry year drafts from Pleasanton wells.

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6. From a study of the boundary of the artesian basin the elevation of ground surface and other data, it was determined for each tract whether it was within or outside of the former flowing well area. As in many instances wells had not been drilled on the tracts prior to 1898, the data was not available as to the exact boundary of the flowing well area. The writer has included all tracts upon which there was in his opinion any possibility of flowing wells being obtained prior to the Spring Valley Water Co. operations. Portions of some tracts have been included upon which it is doubtful if flowing wells could ever have been obtained, but which could be served by water from flowing wells on the balance of the property. It also includes areas upon which flowing wells could probably be obtained but from which the

9631 flow would probably be insufficient for irrigation purposes. The doubtful areas have been included so as to eliminate the possibility of excluding any former flowing well area. The results of this study are shown on Table 4, column 10.

7. The increased pumping lift due to Spring Valley operations results from (1) lowered water level due to average annual draft, (2) depth maximum water level in wells on artesian area is below the surface, and (3) local cone of depression at wells within former flowing well area. Lowering due to annual draft was computed by adding to one-half the annual lowering due to average draft, three-fourths the weighted average additional lowering due to draft during two dry years in succession once in 15 years. As an example of this, on Tract P-268 the lowering due to average draft is 4 ft. and to two consecutive years of draft 10 ft. The weighted average is $(4 \times 14) \div 10 = 4.4$ ft.; the increased pumping lift due to draft is $\frac{4}{2} + \frac{3}{4} (0.4) = 2.3$ ft. Depth maximum water level is below the surface was computed by subtracting average ground water level October 1, 1911, from average ground surface and subtracting from the difference 1.5 ft., representing the distance that the level of October 1, 1911, is below the average yearly maximum level since Spring Valley operations began. (Table 5). This lowering approximately represents the average distance by which the water level in the artesian basin at the commencement of the annual draft season stands below the ground surface where formerly it would always have stood at or above ground surface. The assumed lowering due to the local cone of depression from pumping at wells which were formerly within the flowing well area is based on the writer's experience and a consideration of local conditions. This lowering is omitted outside the former flowing well area. Total increased average pumping lift is the total of those three items.

9632 8. The increased annual cost of pumping for irrigation from wells on tracts was computed for a duty of $1\frac{1}{2}$ acre feet per acre. From Item No. 1 of cost data it was concluded that a figure of 7 cents per acre foot lifted one foot would represent the average operation cost for the range of lifts involved in Livermore Valley. This, multiplied by the duty, gives the increased operation cost per foot of lift per acre. To this was added fixed charges on tracts within the former flowing well district. This amounted to 14 per cent. on \$8.13 per acre, or \$1.14 per acre. Fixed charges were also added on tracts outside of flowing well area where the maximum lift was increased to exceed 40 feet. The amount was \$0.29 per acre, or 14 per cent on \$2.11, per acre, the increased cost of the motor and deeper pit necessary for the increased lift. It was determined from well logs that prior to Spring Valley Water Company operations, 12-inch casing wells 80 ft. deep would penetrate water-bearing gravels to a sufficient depth to insure a per-

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manent supply within the artesian area, and wells 100 feet deep within the open gravel reservoir area. The maximum lowering of the water plane due to the Spring Valley operations plus local draw-down due to pumping from the well was, on no tract, great enough to lower the water level in the well to within 10 feet of the bottom. It was therefore not considered necessary to include any fixed charge for increased capital cost of wells.

9. The increased cost per acre, multiplied by the acreage and totaled for all tracts, gives the total damage for the whole area, which, capitalized at 6%, gives the total damage. This is shown at the bottom of Tables 4 and 4-A and is \$102,900 for the Pleasanton Ranch lands and \$14,439 for the Pleasanton Well Tracts north of County Road 2000.

Table 1.

ANNUAL DRAFT FROM LIVERMORE VALLEY GRAVELS AT PLEASANTON WELLS BY SPRING VALLEY WATER COMPANY.

9633

Year	Total draft in Mil. gal.	Average daily draft m.g.d.	Maximum daily draft		Maximum monthly draft	
			Date	m.g.d.	Month	m.g.d.
1898.....	611	1.7	12/14	6.6	Dec.	5.4
1899.....	1005	2.8	8/26	6.3	Aug.	5.1
1900.....	771	2.1	9/29	6.3	Oct.	5.6
1901.....	1018	2.8	10/12	6.9	Nov.	5.4
1902.....	1643	4.5	9/21	7.4	Oct.	6.6
1903.....	2178	6.0	8/13	7.7	Aug.	7.5
1904.....						
1905.....						
1906.....						
1907.....						
1908.....						
1909.....						
1910.....						
1911.....	1167	3.2	1/1	8.6	Jan.	8.1
1912.....	2072	5.7	11/27	8.9	Dec.	8.3
1913.....	2778	7.6	9/1	11.4	Dec.	9.4
1914.....	2720	7.5	9/26	14.3	Aug.	13.3

Note: Records Aug. 19, 1898, to March 1, 1904, from City's data.

No records Mar. 1, 1904, to Dec. 31, 1910.

Records Jan. 1, 1911, to Aug. 13, 1913, from data on file in City Engineer's Office.

Records Aug. 13, 1912, to Dec. 31, 1914, from Spring Valley Water Co. office data.

Table 2.

9634 EVAPORATION FROM MOIST LANDS OF LIVERMORE VALLEY OVER-
LYING ARTESIAN BASIN AND GRAVEL RESERVOIR FOR
SEASONS 1911-12 AND 1912-13.

Season	Enclosing Contours	Area in Acres	Depth of Evaporation in inches			Equivalent volume in M.G.		
			Summer	Winter	Total	Summer	Winter	Total
1911-12.....	0-2	230	36.0	8.0	44.0	229	52	281
.....	2-6	1500	24.0	5.5	29.5	980	224	1204
.....	6-9	2500	7.3	1.7	9.0	497	115	612
Totals.....		4230				1706	391	2097
1912-13.....	0-2	0	36.0	8.0	44.0	0	0	0
.....	2-6	1000	24.0	5.5	29.5	652	149	801
.....	6-9	1500	7.3	1.7	9.0	30	7	37
Totals.....		2500				632	156	1108

Obtained from map p. 483 of Future Water Supply of San Francisco by
Spring Valley Water Company.

Obtained from data in office of City Engineer.

9635 (Tabulation for record from APPENDIX A, Sheet 14½)

Page 14½

Table 3.

UNDERGROUND WATER SUPPLY OF LIVERMORE VALLEY. TABULA-
TION OF THE DEPLETION AND REPLENISHMENT OF
THE SUBSURFACE WATERS.

For the period October 1, 1911, to December 9, 1913 (800 Days).

(From the Records of Spring Valley Water Company)

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Table 5.

LIST OF CRITICAL WATER LEVEL ELEVATIONS IN WELL H-7.

9636

Year	Elevation of Water Level in Well H-7—Feet		Difference of maximum and minimum elevation (feet)
	Maximum	Minimum	
1899.....	331.0	326.0	5.0
1900.....	330.5	326.3	4.2
1901.....	332.1	326.9	5.2
1902.....	330.7	324.6	6.1
1903.....	330.1	323.9	6.2
1904.....	328.7	323.7	5.0
1905.....	328.0	323.7	4.3
1906.....	330.8	326.6	4.2
1907.....	334.9	327.7	7.2
1908.....	330.5	325.3	5.2
1909.....	331.9	326.7	5.2
1910.....	329.7	325.1	4.6
1911.....	332.9	324.7	8.2
1912.....	329.3	318.6	10.7
1913.....	324.0	307.3	16.7
1914.....	329.4	311.6	17.8
Average.....	330.18	323.04	7.20

Elevation of water level in well H-7 October 1, 1911,—328.3 ft.

DIRECT EXAMINATION BY MR. SEARLS.

I prepared an estimate of the reproduction cost of the water rights of the Spring Valley Water Co., as of December 31, 1913.

9637

Questioned by Mr. Olney.

Referring to my statement in this report; "Any attempt to estimate the reproduction cost of acquiring the water rights of the Spring Valley Water Co. involves more or less speculation and assumption": I assume that there would have been developments and use of the water if the Spring Valley Water Co. had not been in existence and using these sources of supply. I discussed that matter in the body of the report.

Taking Alameda Creek, and assuming that the Spring Valley Water Co. had not acquired the rights which it has on that stream at the present time, I think it is quite probable that the natural flow of the stream which the Spring Valley has been diverting would have been appropriated for use elsewhere, and it is quite possible that a considerable portion of it, if not all of that water,

9638

would have been taken for use in such cities as Oakland, Alameda and Haywards. As I have said in the opening portion of the report, such must be on assumption, and is more or less of a speculation. With regard to the possible use in the east bay cities, however, if such use were in progress in 1913, it would have been impossible for that use to have been changed from those east bay cities to San Francisco. It is true that to the extent to which that water has been appropriated and used in supplying any other municipality than San Francisco, the Spring Valley Water Co. could not acquire the rights at all in 1913. Now, as regards the local use for irrigation, which is a possibility, it is a growing belief, apparently, among the people on Niles Cone that irrigation, particularly in dry years, is desirable for trees and for alfalfa. Assuming that there had been a firm and well founded belief among the people there that irrigation was desirable, it is quite possible that all the normal gravity flow of that stream might have been utilized in irrigation in the vicinity of the creek. That is the situation I assumed in working out an estimated reproduction cost, for that is a situation which might permit of the Spring Valley acquiring the use of the water through purchase or otherwise.

9639

As I understand it, assuming that that stream had been flowing down there in a natural way without any diversion by the Spring Valley Water Co., it is possible that a considerable portion of that water flowing freely there would under those circumstances have been taken for irrigation on the valley lands around Niles. In a measure I can tell how extensive that might have been by a study of the stream flow characteristics as indicated, for instance, on the Hydrograph, "Exhibit 187." The use of water for irrigation, and the amount that could have been diverted, would have had to conform with the stream flow characteristics. My assumption in estimating as to the extent of diversion was based on a study of this Hydrograph. I did not assume that all the water that was available would be used for irrigation purposes, for the reason that it would be impossible to utilize those peaks. I assumed that practically all of the water which might be termed normal flow was used—all the water during the summer and late spring,—but in the early spring, when these peaks occur, the pipe capacity would have to be too great to be economical to divert even a fair proportion of the flow at that time. The acreage, I assume, was some 9,300. I assumed that after a study of the probable duty of water under a gravity irrigation system. If I recall correctly, I used a duty of 1.4 acre-feet per acre as the duty which would obtain under irrigation if fully practiced on this area. This duty, when consideration was taken of the regular recurrent stream flow which could be diverted for such purposes, resulted in an acreage

9640

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of about 9,300; in other words, I took the normal stream flow, and took a duty of 1.4 acre-feet per acre, and worked out an acreage on that basis.

To determine the duty in that locality I had certain statements of the local people who had used water under the old Washington & Murray Township Water Co. Ditch; these statements here in the testimony in the case of Clough vs. Spring Valley Water Works. I also had knowledge from Government reports of the average amount of water used for pumping in the Santa Clara Valley where orchards are irrigated, and where water is delivered directly from the pump to the land irrigated, with practically no losses. This average was 1.13 acre-feet per acre for the year. Under a gravity system there would be greater losses than in the case of the direct delivery of water from the land of pumping plants. I also had knowledge of the duty under gravity systems in the Santa Clara Valley. If I recall correctly it is somewhere around 2 acre-feet, or possibly more, per acre in earthen ditches, where the losses are large. The conditions on the Niles Cone would not require as much water as in the Santa Clara Valley, according to all information which I have; furthermore, the system which I design for the irrigation of the area adjacent to Alameda Creek was one with concrete-lined ditches, which would eliminate to a great extent seepage losses, so that after a thorough study of the situation I considered that assuming that irrigation was generally practiced on the Cone—which is not, and cannot be the case—that a duty of 1.4 acre-feet per acre would be proper and sufficient.

9641

(Estimated reproduction cost of the water rights of the Spring Valley Water Co. introduced and marked "Defendants' Exhibit 190".)

9642

(Counsel for Plaintiff here made the motion to strike out all of that portion of the witness' testimony which he has already given which quotes from the testimony or findings, or anything else in the Clough case. Also, objection was made to use of the findings of the Court in that case.)

(Ruling was deferred on the above objection until Counsel submit their authorities.)

9644

Witness: CHARLES H. LEE for Defendants.

DIRECT EXAMINATION BY MR. SEARLS.

Estimated Reproduction Cost of the Water Rights of Spring Valley Water Company, by me as consulting engineer.

9645

Any attempt to estimate the reproduction cost of acquiring the water rights of the Spring Valley Water Company involves more or less speculation and assumption. The use to which the

various sources might have been put, the probable demand for water, the mental attitude and intelligence of local communities and property owners and the skill and judgment exercised in buying are all elements of uncertainty. The conclusion which is reached is largely the result of the initial assumption. These will vary widely with the individual making the estimate. I desire to state clearly at the outset of this estimate certain general assumptions which have guided its preparation.

First, it is assumed that riparian owners on the various stream sources to be acquired have not been antagonized or influenced in their opinion of the value of their riparian rights by the operations of the very company whose rights it is proposed to reproduce. If riparian owners along stream sources from which the Spring Valley Water Company draws its supply are today possessed with inflated ideas as to the value of their riparian rights, it is in my opinion largely due to publicity and discussion brought about by the company's presence in the past and not the result of normal conditions. This abnormal cause, it seems reasonable to assume, would not have existed if the property were being reproduced today.

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Second, it is assumed that the best methods and skilled buyers will be employed in acquiring riparian rights and that the value of the right to the seller will be considered in determining price as well as the prospective value to the purchaser. The seller should be fully compensated for his loss but it is unreasonable, in my judgment, to assume that the average riparian owner when approached by a skilful buyer could not be influenced by a consideration of the value to him as well as to the prospective purchaser.

The reproduction cost of the water rights of the company in use in supplying San Francisco with water has been estimated as of December 31, 1913. The following memoranda are explanatory of the estimate and summarize the results. The water rights of the company will be considered under the two heads of riparian rights and rights based on use.

RIPARIAN RIGHTS.

Before making this estimate, I went over the ground inspecting each riparian parcel and also made a study of all available information which might aid in obtaining an understanding of local conditions. I also obtained information of the few purchases of riparian rights in the San Francisco Bay region other than those under consideration. These purchases are as follows:

Carmel River, Monterey Co. The Monterey County Water Works in 1883 and 1884 purchased certain riparian rights on Carmel River below the point of diversion of a pipe line taking

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water from the flow of the stream for domestic use in the City of Monterey and vicinity. The total riparian frontage controlled by the company is 166,252 feet. Of this, the purchase price of 14,020 feet is ascertainable independently of land or other property as follows:

Parcel No.	Length of Riparian Stream-frontage Ft.	Amount Paid to Grantor	Cost per Lineal Foot	9647
8.....	3070	\$ 53.00	\$.02	
10.....	1390	20.00	.01	
11.....	1450	25.00	.02	
14A.....	1580	505.00	.32	
15.....	2970	5.00	.002	
25.....	3560	39.00	.01	

The California Railroad Commission (Decision No. 1855, pp. 532-5, Vol. 5, Opinions and Orders) estimated the original cost of the total frontage owned by the company as \$53,200, or \$0.32 per linear foot. I understand that the riparian land is in the valley bordering the river below the point of diversion and is agricultural land.

Questioned by Master.

That table was obtained from the decision of the Railroad Commission. Taking the first parcel No. 8, with a riparian frontage of 3,070 feet, where I state that the amount paid to the grantor was \$53. That was taken directly from the decision of the Railroad Commission. What I intended to convey there was the fact, as drawn from the decision of the Commission, that only 14,020 feet of riparian frontage purchased was purchased independently of other consideration, such as land or other confusing elements. The purchase of 14,020 feet was clearly the purchase of riparian rights separate from the land. The table shows those purchases as set forth in the decision. The Commission, apparently, in estimating the total cost of the whole frontage as \$53,200, took the parcel 14-A, which is listed here at a price of 32 cents, on the assumption that that probably represented the fair average cost, the others being discarded. This was a case where the Commission was merely reviewing a matter already concluded. If I recall correctly, the process by which it was determined was not stated. It was my assumption that the estimated total cost of \$53,200, as stated by the Commission, was based upon the purchase price of Parcel 14-A, for the reason that that total sum, divided by the total frontage, gives 32 cents, the amount paid for Parcel 14-A.

Lagunitas Creek in Marin County. The Marin County Water Company in 1871 and 1872 purchased practically all the riparian rights along Lagunitas Creek from the proposed San Geronimo

Dam to the Pacific Ocean for the purpose of diverting the stream above the lands of the grantors and selling water to the inhabitants of towns in Marin County. The total frontage purchased was 104,985 feet and was obtained from 12 individual grantors. The total price paid was \$20,900 or \$0.20 per linear foot. (Decision No. 2279 Calif. State Railroad Com., pp. 27-29). The creek flows in a narrow valley most of the distance and the riparian lands are hilly.

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I have been over the stream. As to total amounts paid, the information which I have was taken from the decision. I took the map, which contains the actual parcels listed, and determined from such map the frontage in each individual parcel, and applied that to the total purchase price, and did not take the frontage of the parcel which was not acquired. The cost per front foot represents the cost for the actual frontage obtained.

Liddell Creek in Santa Cruz County. The City of Santa Cruz in 1912 purchased the riparian rights along Liddell Creek, a short coast stream, from the Coast Dairies and Land Company for \$20,000. The amount paid per foot of riparian frontage was \$1.00 (Decision and testimony on Application No. 1639 Calif. State Railroad Commission). The creek channel is in a more or less narrow canyon almost to the ocean.

Pescadero Creek in San Mateo County. The Spring Valley Water Company in 1886 and 1887 purchased certain riparian rights along Pescadero Creek. A partial frontage of 44,647 feet was acquired from thirteen grantors at a total cost of \$3,460, or at the average rate of \$0.08 per foot.

The unit adopted by me as the most logical and practical for analyzing the cost of riparian rights is the linear foot of riparian frontage on the stream. This is fixed, is readily obtainable and is a quantity which would naturally appeal to both land owner and purchasing agent as a practical basis for determining prices. This is the method followed by the company in many instances in making the original purchases on San Mateo Creek and Alameda Creek. Inspection of Table 2 shows that there is no consistent relation between the price paid per front foot and the depth of the riparian parcel.

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Table 2 accompanies this report at the back. That is the large table there, covering several sheets. In this table the various riparian parcels on the different streams are listed, together with the original cost of the tract per acre and per lineal foot. Furthermore the areas of riparian tracts may be reduced by sale of a portion of the tract not touching the stream, while frontage never varies.

The accompanying tables No. 2 and 3 set forth the original cost of the Spring Valley Water Co. riparian right parcels where

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available and the cost per acre and per front foot as computed therefrom. Where the frontage is not stated in the deed or inventory, it was obtained by scaling from the Spring Valley atlas sheets.

Alameda Creek. The cost of reproducing the riparian rights for this stream, separate from the land, was estimated for all riparian parcels from fee Parcels 228, included in the city's appraisal as real estate in use, to tide water. (Table No. 2). The unit cost per linear foot was based on the average original cost for the stream, increased by the same percentage that local assessed real estate values have increased since the purchases were originally made. The lands riparian to the stream have been used for agricultural purposes or as grazing land for many years, and land values are still largely influenced by the utility of the land for these purposes. The cost of acquiring of the riparian rights in my opinion would under the local conditions increase with the land value. Most of the riparian right parcels below Niles were purchased in 1888. Tracts above Niles owned in fee by the company were purchased from 1875 to 1898, most of those for which cost data is available being acquired in the latter year.

The assessed value of real estate in Santa Clara County and Washington Township in Alameda County is shown in Table 1.

Those figures were taken from the Assessor's books in Alameda County, and the figures for Santa Clara County were obtained from data in the Public Library. I do not know the exact publication, but it was an official compilation of assessed values in Santa Clara County, gotten up by the State Government, I think.

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Questioned by Master.

Table 1, second column, which pertains to Washington Township, refers to all the real estate in Washington Township, by whomsoever owned. There is no distinction between hill land and low land. In Santa Clara County the assessed valuation includes the whole county.

It appears that the average rate of annual increase from 1888 to 1913 is at the rate of 1.89 per cent in Santa Clara County, and 1.88 per cent in Washington Township. In other words, real estate values in 1913 were 48 per cent greater than in 1888. The similar increase of value in Washington Township since 1898 is 58 per cent.

Questioned by Master.

The date 1898 is the date when the majority of the parcels purchased by the Spring Valley Water Co. above Niles were acquired, in Niles Canyon. The date 1888 is when those parcels below Niles on the Niles Cone were acquired.

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The average cost of extinguishing riparian rights per lineal foot below Niles in 1888, as shown on Table 2, was \$2.14. Increasing this amount by 48 per cent, there results \$3.20. That is on the

third sheet of Table 2. The same costs were used here as were brought out yesterday in my matter as regards original costs.

Questioned by Mr. Searls.

These original costs are the cash costs as far as could be ascertained. The authority for those appear in the tables shown yesterday. In getting at the average of \$2.14, those parcels for which the frontage was available were used. In most instances that is available.

9654 The average amount paid per linear foot for riparian lands in fee along the bed of Alameda Creek between the town of Niles and Sunol Dam as computed from the estimates of original cost of riparian rights for each tract is \$1.08. (Table No. 2.) This amount increased by 58 per cent gives \$1.70 per linear foot.

Assembling the data for Alameda County (shown in detail on Table 2) there results the following as the total reproduction cost of riparian rights separate from land from Sunol Dam to tidewater, exclusive of riparian lands included by the city as real estate in use:

Sunol Dam to Niles Dam, 33,798.4 lin. ft. at \$1.70.....	\$ 57,457.28
Niles Dam to Niles (fee parcels), 20,744 lin. ft. at \$1.70.....	35,264.80
Niles Dam to tidewater (riparian right parcels), 130,654.50 lin. ft. at \$3.20	418,094.41
Total	\$510,816.49

9655 The fee parcels below Niles Dam refer to the parcels which the company owns in the bed of the stream in fee. For the fee parcels between Niles Dam and Sunol Dam, the estimate of cost for riparian lands in the bed of the stream was stated yesterday, and used as a basis. That is the \$1.08. The \$1.08, the base cost, depends upon not only those parcels which lie solely in the beds of the stream, but also upon my estimated cost of the parcels which lie both in the stream and on the hills. I estimated a segregation of the original cost between the riparian rights and the value of the land, of the portion not riparian to the stream. The idea was that the riparian right cost was practically the same as the cost of the land in the bed of the stream would have been.

A careful analysis has been made by me of the damage to lands on Niles Cone, resulting from the diversion from the natural flow of Alameda Creek, which has been made since 1888 by the Spring Valley Water Co. The detail of this study is attached as Appendix B.

Questioned by Mr. Olney.

When I speak of riparian lands, I have made an estimate both for the lands which are physically riparian, and for lands which the seepage from the stream might replenish the ground water beneath.

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This title, "riparian," might be considered slightly misleading in that respect.

DIRECT EXAMINATION BY MR. SEARLS.

As a result of the study, I conclude that the total damage to lands on the Cone is much less than the amount originally paid for the riparian rights. As compared with the estimated cost of reproduction of riparian rights, amounting to \$418,094, the damage is very small; in other words, the study was merely one to compare the actual amount paid and the estimated reproduction cost with the probable damage, and the figures were not used in the reproduction cost, except in that confirmatory way, so as to make sure that the damage was not greater than the reproduction cost as I have estimated it.

Questioned by Mr. Olney.

I found as a total cost of acquiring the rights in the lands riparian to the stream, the total reproduction cost, \$510,816. That includes lands above the Niles Dam up to Sunol Dam. My thought is this, that the \$418,094, the estimated reproduction cost of riparian rights on the Cone, would naturally be in the mind of the land owner, and the damage to him would be made up by this diversion and other elements. I wished to assure myself that this damage did not exceed my total amount; if it did, then obviously my total amount would have to be raised. I found, on making the investigation, that the amount of the damage is very much less than my total estimated reproduction cost, and therefore I am assured that this total estimated reproduction cost includes that damage as well as any other element which may inter in. In acquiring these riparian rights you would buy the rights appurtenant only to those lands which were physically riparian to the stream. That damage to the land would not come in in the purchases which you would make from the owners of riparian lands, probably, but in order to make sure that even if that damage from legal consideration would be involved, I estimated that also; in other words, I wanted to make sure from every point of view, even if the assumption was made, that lands not physically riparian to the stream had a claim on the waters of the stream by percolation. I wanted to assure myself that even then the damage would not exceed my estimated reproduction cost.

The Spring Valley Water Co. in going down there, and acquiring those rights at the present time, would have to pay, below Niles Cone, some \$418,000 for the riparian rights. I figured that the estimated reproduction cost of \$418,094 was sufficiently large to take care, even of any additional expenses due to damage on other lands. The additional damage is small, and might not be recognized. As far as it affects this estimated reproduction cost, it certainly is negligible. I did not understand that the company ever did pay

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any money to extinguish any claims beyond the riparian land, if it now exists. The situation is practically this, that I did not consider that these other lands were substantially damaged, and accordingly, having made what I considered a liberal allowance on the riparian rights, I just left it out.

DIRECT EXAMINATION BY MR. SEARLS.

After considering the matter from various points of view, it is my opinion that the riparian rights of the Spring Valley Water Company on Alameda Creek could be reproduced in 1913 for an amount not to exceed the sum of \$510,816 plus 10 per cent for overhead expenses.

San Mateo Creek. The cost of reproducing the riparian rights on this stream was estimated for all riparian parcels from the subdivision line of fee Parcels 36 and 90 above which the real estate is included in the city's appraisal as in use, to tide water (Table 3). The original cost of riparian rights on this creek I consider as being the best index of cost in 1913. The riparian parcels are many of them at present built up town lots in the city of San Mateo. East of the subdivided portion of San Mateo the land is salt marsh to the Bay. West of San Mateo, a large portion of the riparian parcels are in the city of Hillsborough and on the north side of the creek are more or less built up with suburban homes. Much of the creek channel west of San Mateo is in a steep narrow canyon. The natural flow of the stream was widely fluctuating, being large during winter storms and very small during the summer months. The utility of the riparian rights along San Mateo Creek, in my opinion, is less today than at the date most of the purchases were made in the late '80's. On many of the parcels, the storage of flood water in Crystal Springs Reservoir is a positive benefit through elimination of flood damage.

After consideration of the matter from various points of view, it is my opinion that the riparian rights of the company on San Mateo Creek could be reproduced in 1913 for not to exceed the sum of \$186,418.60 plus 10 per cent for overhead expenses.

Pilarcitos Creek. The cost of reproducing the riparian rights on this stream was estimated for all riparian parcels from Stone Dam to Pacific Ocean. The original cost is not available in such shape that it can be used as an aid in estimating reproduction cost in 1913. Consideration was therefore given to unit costs per linear foot on other streams, the extent to which the Spring Valley diversion has affected the natural flow of the creek and the riparian uses to which the water is put.

For the purpose of analysis, the stream was divided into three sections, one from Stone Dam to the east boundary of the Spanish Grants, the second from the latter point to the junction of the tribu-

tary creek from the south at the town of Half Moon Bay, and third from the latter point to the Ocean. In the first section, consisting of 40,920 linear feet of creek frontage, the stream is in the bottom of a narrow steep sided canyon in which very little agriculture is possible and most of that is on the hill slopes above the stream. Several tributaries enter the main stream in the lower portion of this section. The natural moisture in the soil is sufficient without irrigation for the crops that can be raised. After a consideration of all the factors involved, I have concluded that riparian rights could be reproduced in this section at not more than an average cost of \$1.00 per linear foot of frontage.

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In the second section of 22,440 linear feet, there is a narrow strip of agricultural land in the canyon bottom flanked by the steep hill slopes. Several tributaries enter the main stream in this section. Most crops can be grown on the bottom land without irrigation. A small acreage planted in artichokes is irrigated, but I am informed that this crop does not do as well in the canyon as out on the slope near the Ocean. Consideration of all the factors involved leads to the conclusion that the riparian rights in this section could be reproduced at not more than \$1.25 per linear foot of frontage.

The third section embraces the settlement of Half Moon Bay and the coastal plane to the Ocean, a total frontage of 13,834 feet. Outside of built-up town lots the land is largely used for raising artichoke and field crops. The soil is rich and productive. Artichokes are irrigated from June on to September, water being obtained from either wells or by pumping from the stream, which flows until late in the year. A large tributary stream enters Pilarcitos Creek at the upper end of this section of the creek. Due to the large area tributary to Pilarcitos Creek below Stone Dam, some of which receives an annual rainfall nearly as heavy as that above Stone Dam, the effect of the Spring Valley diversion from the upper creek would not greatly reduce the flow of the stream below Half Moon Bay. After consideration of the various factors, it is my opinion that the riparian rights of the company could be reproduced on this section of the stream for not more than \$2.00 per linear foot.

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Assembling the data for Pilarcitos Creek, there results as the total reproduction cost of riparian rights for the creek, the following:

Stone Dam to Grant line, 40,920 lin. ft. at \$1.00.....	\$40,920
Grant line to Half Moon Bay, 22,440 lin. ft. at \$1.25.....	28,050
Half Moon Bay to Ocean, 13,834 lin. ft. at \$2.00.....	27,668
	<hr/>
	\$96,638

It is my opinion that the riparian rights of the company on Pilarcitos Creek could be reproduced in 1913 for a sum not to exceed \$96,638 plus 10 per cent for overhead expenses.

Lake Merced. It has been stated that Lake Merced had a well defined outlet to the Ocean prior to the construction of the dam at the lower end of the lake by the Spring Valley Water Company. I am of the opinion that during a portion of the year at least, the only former outlet of the lake was by seepage and evaporation, the period of flow being confined to the winter and spring. The distance from the dam to the ocean is approximately 3,500 linear feet.

The topography consists of irregular sand dunes.

An amount of \$3,500 is included in this estimate as the cost of reproduction of the riparian rights along both sides of this former outlet of Lake Merced.

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Questioned by Mr. Greene.

My opinion that there is not a constant flow from Lake Merced is based upon my general familiarity with the lagoons along the coast. Sandbars generally form in the late spring and summer, and the stream flow is maintained only during the flood flow period; during the summer it is not maintained in a distinct flowing channel.

Questioned by Mr. Olney.

Of course, Lake Merced was a much larger lagoon than most of those along the coast, but generally considered, it is of that type. My opinion is based upon that assumption. I had no information as to the flow of the stream. The opinion is based upon my investigation there and general knowledge of that type of formation up and down the coast; also the fact that the formation there is sandy and porous between the lake and the ocean.

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Questioned by Mr. Greene.

I have taken 50 cents per linear foot as the basis of the riparian right there, 50 cents for both sides. 3,500 feet is approximately the length of one side, and I doubled that and took 50 cents per linear foot.

Questioned by Mr. Searls.

I took both sides in my computation. The linear frontage, as stated, is for both sides. If the straight linear frontage measured, say 60,000 feet, 120,000 would be used, and the unit of \$3.20, or whatever it was, was multiplied by the linear frontage, both sides.

Underground Water Rights in Livermore Valley. The estimated cost of reproduction of the rights of the Spring Valley Water Company to develop water at Pleasanton Wells I estimate on the basis of the damage to the overlying land owned by the company and not included by the city in its appraisal as real estate in use. (See Appendix A of original cost estimated.) These lands were acquired in 1911 and 1912 and the extent of damage as estimated in connection with original cost would not differ for reproduction cost in 1913. It is assumed that the existing Hearst agreement could be reproduced.

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Assembling the various amounts there result as my estimate of the reproduction cost of the company's rights to develop water in Livermore Valley as of December 31, 1913, the following:

Pleasanton Ranch Lands	\$102,900.00
Scrivner agreement	1,850.00
Grant Gravel Co.	17,500.00
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Total	\$122,250.00

Recapitulation of Estimated Reproduction Cost of Riparian Rights.

The total cost of reproducing the riparian rights of the Spring Valley Water Company I estimate roundly as \$1,011,600, segregated as follows:

Alameda Creek	\$ 510,816
San Mateo Creek	186,418
Pilarcitos Creek	96,638
Lake Merced Outlet	3,500
Livermore Valley	122,250
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Total	\$ 919,622
Add 10% for overhead expenses	91,962
Grand Total	\$1,011,584

WATER RIGHTS BASED ON USE.

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In reproducing the property of the Spring Valley Water Company in 1913, it is assumed that the company had not previously acquired its present sources of supply. This of necessity would mean that at least a portion of the water now diverted by the company would have been appropriated to other uses. It is therefore necessary to make some assumption with respect to such probable appropriations. It is recognized that such assumptions must be even more speculative than in the case of reproduction of riparian rights. In order to get at some approximation of the gross amount which the company might have to pay to reproduce such rights, the following study has been made and is submitted for what it is worth.

In general, it is assumed that none of the present Spring Valley Water Company sources had been developed for use in San Francisco prior to 1913, since such an assumption would involve a determination of the cost of acquiring the very rights whose reproduction cost is sought.

SAN MATEO CREEK.

The soil and climatic conditions within economic range of a supply from San Mateo Creek are such that irrigation for raising commercial crops would not be economically feasible. It will, therefore,

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be assumed on this stream that a water system such as the San Mateo Water Works had developed with the country and was engaged in supplying domestic water to the city of San Mateo and vicinity. The probable development of this district in 1913 and the consequent demand for water would not in my opinion warrant the heavy expenditures necessary for the large storage structures which have been built by the Spring Valley Water Company for the supply of San Francisco. It is more probable that the dependable flow of the stream with comparatively small storage regulations supplemented by water pumped from wells as at present, would have been the sources of supply of such a local company.

I am informed that it is doubtful whether the Spring Valley Water Company would have the right of condemnation of the property of such a company. The probable method of acquisition if possible at all would be by agreement similar to that actually made between the San Mateo Water Works and the Spring Valley Water Co. in 1883. By this agreement, the Spring Valley Water Company acquired the storage structures and reservoir and watershed lands of the local company, but in effect, the developed water right was reserved. The cost to the Spring Valley Water Company outside of lands would therefore be represented by the inexpensive storage structures necessary to be abandoned. This would not in my opinion exceed \$200,000.

PILARCITOS CREEK.

The conditions on this stream are such that it is improbable that any organized attempt would have been made to appropriate and use the waters of the stream off of the riparian lands. The local demand for domestic water at Half Moon Bay is very small, and there are no other communities within a reasonable economic distance of the stream which are not adequately supplied. The demand for water in irrigation of artichokes in this region is limited to the best lands of the narrow coastal plane. This is crossed by other streams at intervals some of which flow well into the summer and fall. It is also feasible to develop water for irrigation from wells on much of the land. The local rainfall is heavy and moist fogs are prevalent during most of the crop growing season. It is my opinion that no water rights other than riparian would have to be acquired on this creek if the Spring Valley Water Company was to reproduce its present water rights in 1913.

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ALAMEDA CREEK.

The possible uses to which the natural flow of this stream might have been put are for the domestic supply of the East Bay cities or irrigation on Niles Cone. In the event of the first use, as I am informed, the Spring Valley Water Company would not have the power to condemn unless it continued to serve the same territory. It there-

fore could not reproduce the water right for use in supplying San Francisco. While irrigation on Niles Cone has been very little practiced in the past, and in my opinion never will be universally practiced in the future, yet the use of pumped water for irrigation of certain crops is increasing.

It will be assumed with regard to the natural flow of Alameda Creek that an irrigation system had been developed by the local land owners for the irrigation of lands on Niles Cone and vicinity, and that in order to reproduce the Spring Valley Water Company rights with respect to Alameda Creek this system and its water rights would have to be acquired. The extreme case will be assumed namely that irrigation was universally practiced under the system. The cost of acquiring the system could not well exceed the cost of a substitutional supply from local pumping plants for the acreage served. That irrigators could be induced to make such a change I believe is a reasonable assumption, in view of the local climatic and stream flow conditions as a result of which irrigation is unnecessary at the time stream flow is most plentiful and in dry years and in late summer when it is needed, the most stream flow is at the lowest. Notwithstanding this, the irrigator must pay the continuous operation of the system.

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This supposition is confirmed by the fact, of which I have been informed, that irrigators under gravity systems in Santa Clara Valley are in a number of instances voluntarily changing from gravity to pumped supplies where well water can be developed because of the greater dependability of the latter. It is possible to develop irrigation supplies from wells over practically all of the Niles Cone.

For the purpose of determining the cost of acquiring such an irrigation system, detailed studies were made of the probable cost both for a gravity system and by pumping from individual wells for an area of 9,300 acres adjacent to Alameda Creek on Niles Cone. The aggregate cost of individual pumping plants for this area was found to exceed the cost of a gravity irrigation system. The cost of the substitutional supply, together with the capitalized difference of the annual costs for irrigation water under the two systems I estimate at \$380,000. A round sum of \$400,000 is considered sufficient for the acquisition in 1913 of any gravity irrigation system on Niles Cone which might have been developed if the Spring Valley Water Company had not made the Alameda pipe line diversion. It is assumed, however, that the right to divert from the natural flow of Alameda Creek as thus acquired would not exceed the historic diversion of the company from this source.

LIVERMORE VALLEY.

With regard to the right of the company to develop water from the Pleasanton wells, it is not considered probable that any use would

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have been made of this supply for irrigation, other than on the over-lying land. If this supply had been developed for domestic use in the East Bay cities, it would be impossible for the Spring Valley Water Company to acquire it for use in San Francisco. I make no allowance for that.

RECAPITULATION.

The total cost of reproducing all the water rights of the Spring Valley Water Company I estimate roundly as \$1,611,584, segregated as follows:

Riparian rights	\$1,011,584
Rights based on use	600,000
Total	<u>\$1,611,584</u>

Such an estimate, as stated before, is necessarily based on more or less speculation, but is submitted as being within the realm of reasonable probability.

Since the preceding memoranda were prepared, I have been informed through letter from Mr. Behan, secretary of the Spring Valley Water Company of certain riparian rights owned by the company on the upper reaches of Arroyo Honda, Alameda Creek and Arroyo Valle. These were acquired by the company at the time of the "Calaveras purchase" by deed from the San Francisco and Oakland Water Company, dated June 25, 1875. The topography of the lands covered by these rights is rough and steep and the rights could be of little value to the owners of the lands.

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Furthermore, the acquisition of these rights by the company, I am informed, is unnecessary to permit the diversion by the company at Sunol filter beds. In order to cover these rights, however, in reproduction cost a nominal sum of \$1,000 has been added.

With this addition, I find the estimated reproduction cost of the water rights of the company to be \$1,612,584.

HERE OCCUR THE FOLLOWING TABLES.

Table 1. Assessed Value of Real Estate—Santa Clara County and Washington Township.

Table 2. Sheet 1, estimated reproduction cost Spring Valley Water Co. riparian rights on Alameda Creek used in supplying San Francisco with water, as of December 31, 1913.

Table 2. Sheet 2, estimated cost of Spring Valley Water Co. riparian rights on Alameda Creek used in supplying San Francisco with water, as of December 31, 1913.

Table 2. Sheet 3, estimated reproduction cost Spring Valley Water Co. riparian rights on Alameda Creek used in supplying San Francisco with water, as of December 31, 1913.

Table 3. Estimated reproduction cost Spring Valley Water Co. riparian rights on San Mateo Creek used in supplying San Francisco with water, as of December 31, 1913.

APPENDIX "B" TO DEFENDANTS' EXHIBIT 190.

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ESTIMATE OF DAMAGE OF LANDS RIPARIAN TO ALAMEDA CREEK ON NILES CONE RESULTING FROM DECREASED FLOW OF THE CREEK DUE TO ALAMEDA PIPE LINE DIVERSION BY SPRING VALLEY WATER COMPANY.

The following summary of the physical conditions on Niles Cone and estimate of the damage to riparian lands resulting from the Spring Valley Water Company diversion from the actual flow of Alameda Creek has been made by me, based on personal investigation on the ground, and a study of all available data.

GENERAL.

Niles Cone is embraced within the gently sloping alluvial plane extending fan-shaped from the hills at the Town of Niles towards San Francisco Bay (Exhibit). It is located almost entirely within Washington Township. The soil of the cone is fertile and well adapted for agriculture. The region was settled at an early date and the land has been profitably farmed for many years. The upper portion of the cone is intensively cultivated, the holdings being mostly small in tracts of from 5 to 40 acres. Much of the land is here planted to deciduous orchard, as well as nursery, berries, vegetables and various summer crops. Lower down on the cone the tracts are larger, some of them being several hundred acres in extent. Here the principal crops are hay, grain, vegetables, various summer crops and alfalfa. Farm land values range from \$200 to \$800 or \$1,000 per acre, the highest values being attained by the best deciduous orchards in bearing. Lands on Niles Cone riparian to Alameda Creek correspond in character and development with adjacent lands similarly located on the cone.

Irrigation is not generally practised on Niles Cone, the climate and soil conditions not being such as to require it. Prior to the dry years of 1912 and 1913 there were very few irrigation pumping plants, and such as there were had been installed for the irrigation of special crops such as nursery stock or because of the owners' individual opinion in the matter. The dry years, however, have taught the value of a pumping plant on an orchard tract as insurance against

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drought and during the past three or four years a number of plants have been installed. There has also been a marked increase in the acreage of alfalfa on the lower cone in recent years and irrigation of this crop from pumping plants is now generally practiced. The number of crops of vegetables raised annually can be increased by irrigation, and berries do much better with irrigation.

The channel of Alameda Creek crosses the cone near the northern border, finally reaching San Francisco Bay west of Alvarado. (Fig. 3). The channel bed is from 10 to 25 feet below the general level of the adjacent lands, and the banks are quite steep. The stream is torrential in flow, being subject to floods during the rainy season and low discharges during the late summer. (Exhibit). Even before the Spring Valley diversion a short section of the stream channel below Niles had been observed to be dry towards the end of the dry seasons. (Testimony of H. Schussler in case of Clough vs. Spring Valley Water Works, p. 687 of transcript).

9675 The use of water from the open stream by riparian owners has always been negligible even before the Spring Valley diversion commenced. No riparian irrigation diversions have been made and the extent of use for stock watering was very limited. Mr. J. C. Shinn, an old resident of the region testified in the case of Clough vs. Spring Valley Water Works that there were only two regular watering places for stock on the creek even prior to 1871. (Transcript, p. 1155-57). Water for stock and domestic purposes and garden irrigation has been obtained from small dug or casing wells, equipped with hand pump or windmill.

The porous material of which the cone is composed is saturated with water below a varying level. This water is derived by percolation from direct precipitation upon the surface of the cone and from the flow of Alameda Creek, principally the latter. Most of this water enters the cone within the porous gravel area of the upper portion of the cone. The water thus absorbed finds its way from the main body of gravel into the interbedded clay and gravel layers of the lower cone and is the source of water drawn upon by local wells. Within the lower portion of the area covered by the clay cap the pressure of the water from the open gravels at higher levels is sufficient to produce artesian flow from wells. The outlet of waters absorbed from the gravel area is by withdrawals from the artesian and pumped wells on the cone and by evaporation from the marshy land at the foot of Niles Cone and the adjacent area. The evaporating land overlies the artesian zone and its surface moisture is derived to a large degree by upward percolation or sweating through the clay cap.

The approximate boundary of Niles Cone as determined by the United States Geological Survey and shown on Plate X of Water Supply, Paper 345-H is reproduced on Exhibit The area of the

cone as thus shown in the paper (p. 127) is stated to be 11,800 acres exclusive of the salt marsh. The detailed studies made by the Geological Survey indicate that adjacent to the cone on the southeast is an additional area of alluvial material covering 9,000 acres which derives its supply of ground water largely from Alameda Creek. The boundary of this area is also shown on Exhibit

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The approximate limits of the main gravel bed in the vicinity of Niles, which correspond with the upper edge of the clay cap, is shown on Exhibit as determined by the writer after a study of the penetration records of wells and other data as given in Water Supply, Paper 345—H (Plate XIV to XVII); and Report on Conditions of Water Supply of Niles Cone, Alameda County, California, by J. H. Dockweiler, Consulting Engineer (pp. 124, 161-180 and 340-381). The area of the open gravel beds as shown is 3,773 acres. The remainder of Niles Cone and the adjacent areas to the southeast, is covered by the clay cap.

The existence of the gravel bed and the clay cap was recognized by Mr. Herman Schussler many years ago, and described by him in his testimony in the case of Clough vs. Spring Valley Water Works (pp. 685-728 of transcript). He describes the gravel beds as follows: "Here is another map of the gravel beds, which indicates the extent of the gravel beds, at what we call the upper end of the gravel delta at Niles. It has been variously estimated, I have not estimated it closely. It is estimated by prominent people, such as Mr. Allardt, at 5,000 acres. I am sure it is between 3,000 and 5,000 acres, that is where the gravel appears, not exactly on the surface, but rather close to the surface; underlying the entire upper end of the delta. The gravel bed I am speaking of forms almost a semi-circle, something like a big fan, with the apex near the old Vallejo Mill site, the radius of the fan reaching and including Centerville, etc. (p. 688 of transcript). The gravel area as thus described agrees generally with the area as determined by me from the more complete data now available.

I have made a careful study of the records of water surface elevations as observed in wells on Niles Cone which penetrate the gravel. Information has been obtained from the testimony of Mr. Ross E. Browne, Hydraulic Engineer for the Spring Valley Water Works in the case of Clough vs. Spring Valley Water Works (pp. 1238 to 1300 of transcript), from Water Supply, Paper 345—H of the United States Geological Survey and other sources. The highest elevation of the underground water plane is at the head of the cone east of Niles. The water plane has a very flat slope from here to a line extending northwest and southeast about $\frac{3}{4}$ of a mile below the Southern Pacific Railroad Bridge at Niles. Beyond this line there is a sharp, almost vertical drop, of about 20 feet. Extending from the point where

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Alameda Creek crosses this line there is a steep half-cone-shaped slope elongated in the direction of flow of the creek, which within a short distance merges into the general ground water level of the main cone. The latter slope is gently toward the bay. The steep cone-shaped slope is wholly within the gravel bed area and varies in extent depending upon the time of year and the elevation of the general ground water surface of the main cone.

The remarkable drop in the water plane just below the railroad bridge at Niles has an important bearing on the problem in hand. The line along which this drop occurs is a line of recent faulting, or movement of the earth's crust, which extends across the alluvial slope from Irvington to the hills northwest of Niles. The position of this fault line as shown in Water Supply Paper 345—H (Plate X) and observed by me is indicated on Exhibit

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As a result of the displacement, a vertical zone of more or less impervious material intercepts the movement of ground water through the porous gravels and acts to a certain extent as an underground dam. The water plane is thus held up on the east side of the line to a considerably higher level than on the west side. (See Water Supply Paper 345—H pp. 149-150.)

The fault line has also influenced the general underground circulation in the region east of Niles Cone. The displacement along the fault line has produced a bank or bluff east of Niles Cone which intercepts all surface drainage from the hills. Both surface and sub-surface drainage between the base of the hills and the fault line has been turned southeast, finding its outlet near Irvington. The area west of the fault line and north of Niles Cone is thus cut off from all local supply from the hills and depends almost entirely upon Alameda Creek, which is the only stream crossing the fault in this vicinity.

The position and behavior of the water plane within the gravel bed area was studied by Mr. Ross E. Browne in 1888 and 1889 and described in his testimony in the case of Clough vs. Spring Valley Water Works. He states that in the dry season the surface of the ground water within the western portion of the gravel area is practically level standing at 20 to 21 feet above low tide water. (Page 1243 of transcript). The water plane was then from 25 feet below the average surface of the ground near the lower border of the gravel area to 40 feet below at a point $1\frac{1}{4}$ miles below the railroad bridge (p. 1271). The slope becomes level at a point $1\frac{1}{2}$ to 2 miles below Niles railroad bridge (p. 1244)), corresponding with the margin of the half-cone-shaped slope above described. The level of the rim of the clay bed encircling the gravel area is considerably (approximately 12 feet at the creek) higher than the ground water level during the dry period. Hence ground water in the gravel bed is dammed

up by the clay bed and prevented from re-entering the creek. The water level in this area is practically stationary in the dry season (p. 1244). In the rainy season the ground water level in this area is replenished and rises to a level of 25 or 26 feet above low tide. The accumulation drains off within four or five months after the flow of Alameda Creek diminishes, however, and again assumes its dry season level (pp. 1248-9). A further statement made by Mr. Browne was the condition of the water level in the lower part of the gravel bed is dependent to a considerable extent on the character of the previous wet season. The water is not materially dependent on the supply of water during August, September, October, November and December (p. 1290).

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The level of water over the eastern portion of gravel beds is considerably higher than the western, having an elevation of 70 feet above the tide at the head of the cone (p. 1243), and 41 feet at the end of the dry season at a point $\frac{5}{8}$ of a mile below the railroad bridge. (Photostat reproduction of Browne's Exhibit No. 2 in Dockweiler Report, page 124). The water plane is from 25 to 35 feet below the ground surface in this area at the end of the dry season. There is also a very marked seasonal change (6 to 10 feet) and the water level is more sensitive to the flow of Alameda Creek. The first freshet of the rainy season makes a material change in the level of the water in the upper portion of the gravel bed, while in the lower portion a much longer period is required. Furthermore, Spring Valley diversion when first made in the fall of 1888 was registered by wells in the upper portion of the gravel area but not appreciably in the lower. Mr. Browne, under the company's instructions, deepened four or five wells southeast from the railroad bridge and within half a mile or a mile from Niles. Mr. Thane, the owner of one of these wells, had made measurements which seemed to show that the diversion had effected his well (pp. 1294-5). For the lower gravel area, however, Mr. Browne was convinced that there was no material effect (pp. 1296-7).

The dividing line between the upper and lower portions of the gravel area as described by Mr. Browne and shown on his Exhibit No. 2 (pp. 1240 and 1242), (also photostat reproduction p. 124 of Dockweiler's report) corresponds with the position of the fault line above described. Hence, the upper and lower gravel bed areas as described by Mr. Browne are above and below the fault line respectively. Their areas as shown on Exhibit are 788 and 2985 acres respectively.

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The flow of Alameda Creek with relation to ground water conditions was also observed by Mr. Browne. In his testimony he states that it requires a flow in excess of from 24 to 35 million gallons per day over Niles Dam to maintain continuous flow across the gravel

beds to the clay channel and on down to San Francisco. If the flow is less than this amount it is entirely absorbed by the gravel beds and a portion of the creek bed is dry. When the flow is sufficient to reach the channel cut into the clay beginning just above the Bell Ranch bridge there is no further loss from the remaining channel to the bay (pp. 1246-7). The continued flow of at least 24 to 35 million gallons per day at Niles Dam is necessary to maintain the water level in the lower portion of the gravel area at its maximum of 25 to 26 feet above low tide (pp. 1248-9). Mr. Schussler testified in the same case (p. 691 of transcript) that it required a flow of from 20 to 24 million gallons per day to maintain a stream across the gravel bed. I have adopted 24 million gallons per day as an average value, although it is my opinion that the amount varies during the year depending on the level of ground water and degree of saturation of the gravels adjacent to the stream.

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A study of the physical situation as briefly outlined above has led me to the conclusions: first, that the effect of the Spring Valley Water Company diversion from Alameda Creek can have no effect upon the ground water supply or levels of Niles Cone as long as the waste over Niles Dam exceeds some quantity which varies but will be assumed as 24 million gallons per day; second, that periods when the natural flow would have been greater than 24 million gallons per day but the waste over Niles Cone is less than this amount, the effect is only to the extent that the natural flow has been decreased below at most 24 million gallons per day; third, that during periods when the total natural flow is less than 24 million gallons per day the effect is at most to the full extent of the diversion; and fourth, that the effect of diversion, if any, would be felt more quickly and with greater severity in the upper gravel area than below the fault line.

The water level conditions for December, 1913, and February, 1914, as shown in Water Supply Paper 345—H, Plate X, correspond generally with the conditions as described by Mr. Browne, but the ground water elevations are very much lower in the lower portions of the gravel area, due to the two extremely dry years preceding the heavier drafts on the underground supply by pumping on the cone. The elevation of ground water in December, 1913, is two to three feet above mean tide or 18 to 19 feet below the level in November, 1888. In February, 1914, it was still rapidly rising. Above the fault line the level adjacent to the creek and $\frac{5}{8}$ miles below the Niles railroad bridge, was 35 feet in December, 1913, or six feet lower than in November, 1888, and in February, 1914, 50 feet above mean sea level. The effect of the dry years was therefore far less severe above than below the fault line.

SPRING VALLEY WATER COMPANY DIVERSION.

The Spring Valley Water Company commenced to divert water from Alameda Creek through the Alameda pipe line across the bay to San Francisco, August 10, 1888 (Findings of Fact, XXII, p. 336 of transcript of case Clough vs. Spring Valley Water Works). The point of diversion was at Niles Dam, located in the canyon about two miles above the Southern Pacific railroad bridge at Niles. In 1900 the point of diversion was moved up stream to the Sunol filter beds just above Sunol Dam. The latter is 3.65 miles up stream from Niles Dam and is located at the upper end of Niles Canyon. The flow of Alameda Creek at Niles Dam, although increased by run-off from the 12 square miles of hill drainage between these two points can for practical purposes be considered equal that at Sunol.

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The Alameda Creek diversion was increased, beginning in the fall of 1898, by the output of wells in Livermore Valley near Pleasanton. This water was allowed to flow down the channels of Laguna Creek and Alameda Creek to the point of diversion at Niles Dam until the fall of 1900, after which date it was diverted at Sunol filter beds. In 1909 a 30-inch pipe line was constructed from the Pleasanton wells to the filter galleries and subsequently water was delivered through this pipe line. The water developed from Pleasanton wells, especially during the period that the Spring Valley diversion effects on Niles Cone water levels, is not a part of the natural flow of Alameda Creek, and in my opinion should be eliminated from the record of Spring Valley diversion in an investigation of the effect of this diversion upon the water supply of Niles Cone.

The total daily natural flow of Alameda Creek at Niles and Sunol Dams, segregated as to waste over the dam and Spring Valley Water Company diversion exclusive of water from Pleasanton wells, is shown on the hydrograph introduced by the city as "Exhibit . . ." in this case. The accompanying Table 2 summarizes the total flow of the creek by years and is based on the data from which the hydrograph was prepared. This table also show the Spring Valley Water Company diversion by years exclusive of Pleasanton wells as it appears on the hydrograph. The separation of the water developed from Pleasanton wells is approximate during the period 1905 to 1910 inclusive, but is regarded as being sufficiently accurate for the computations herein.

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ESTIMATE OF DAMAGES.

The following is an analysis of the damage suffered by lands on Niles Cone riparian to Alameda Creek, as a result of the Spring Valley diversion.

There are two possible results of change in the natural surface flow of Alameda Creek by diversion which might cause damage to the riparian land and depreciation of its value.

1. The rise of the surface stream might be interfered with, either as used directly for stock or other purposes, or as diverted on to the riparian land.

2. The underground water plane beneath the land which is largely fed by the surface stream might by reason of diminished supply become depressed below its normal level. This might either deprive the soil of a source of capillary moisture normally drawn up from the water plane and made available to plant roots during the dry season, or might lower the water level so that pumping for domestic or irrigation use on the land would become more expensive.

The past use of the surface stream by riparian owners has been practically negligible. This has, in my opinion, been due to the character of the channel and stream flow, the ease of obtaining water from wells at seasonable depths anywhere upon the land and other causes, all of which are permanent and if anything will increase in potency as the region becomes more highly developed. The Spring Valley diversion, in my opinion, has not and will not in the future appreciably damage the riparian land as far as the use of the surface flow is concerned.

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The Spring Valley diversion, however, has without doubt had some effect upon the water plane beneath riparian lands. The extent of this will be investigated, first, with respect to the general effect upon the water plane, and then in detail as to the local effect upon the amount of soil moisture available to crops and increased cost of pumping.

The extent to which the Spring Valley diversion can effect the water plane is limited, by the length of channel from which absorption occurs, and the rate of absorption. As previously stated, the portion of the channel from which absorption occurs is confined to the gravel beds. Also, there is a minimum flow at Niles Dam which will maintain a continuous stream across the gravel beds, which according to the data available at the date of the Clough case, is 24 million gallons per day. Assuming this latter as a fact it follows that the Spring Valley diversion can be effective in reducing absorption only when the waste over Niles Dam is less than 24 million gallons per day. Also, that the volume of water withdrawn from absorption is the full diversion during the period that the total natural flow is less than 24 million gallons per day, plus the difference between the diversion during the period that the waste over Niles Dam is less than 24 million gallons per day and the total natural flow greater than 24 million gallons per day, and the amount that the waste over Niles Dam during this same period is less than a continuous flow of 24 million gallons per day. The period of the time each year during which the Spring Valley diversion is effective, and the effective volume diverted can then be computed from the daily hydrograph of Alameda Creek at Niles Dam filed as Exhibit

The data necessary to determine the period of time is assembled on Table 1. It appears that on the average the total natural flow is greater than 24 million gallons per day during the rainy season of each year and as late as May 26, and that the waste over Niles Dam is greater than 24 million gallons per day until May 16. Also that the number of days each year when the total natural flow exceeds 24 million gallons per day is 138 and that the waste exceeds 24 million gallons per day 122 days, making a decrease of 16 days or 11.4 per cent. The period of time when the Spring Valley diversion is effective commences May 16, and extends for 229 days or to December 31. At the latter date, on the average, the flood flow commences and the depleted water plane is rapidly replenished.

The data necessary to determine the proportional volume of the Spring Valley diversion effective in lowering the water plane is assembled in Table 2. It appears that of the average annual diversion of 2,403 million gallons but 1,549 million gallons (4,750 acre feet) or 64 per cent is effective. In view of, first the large volume of water over Niles Dam occurring almost every year the amount of which is nearly 20 times the average effective Spring Valley diversion (Table 2); second, the long period of flow of this waste (Table 1); third, the open porous nature of the material along the creek channel within the gravel bed area; and fourth, the rapid recovery of water levels in wells following the first flood (Water Supply Paper 345—H, pp. 149-160), I am strongly of the opinion that the Spring Valley diversion has no permanent effect upon the water plane of Niles Cone. There is a recurrent lowering of the water plane each year, but this is wiped out by the recurrent flood flow of the rainy season. It is only during a dry year or series of years such as 1911-12 and 1912-13 that the effect of one year's diversion holds over until the next year. This conclusion was also reached by Mr. Ross E. Browne after his careful study of ground water conditions in 1888 and 1889. (Case of Clough vs. Spring Valley Water Works, Transcript of testimony, pp. 1296-97).

The area within which the annual lowering of the water plane occurs and its amount are still to be determined. The sensitiveness of the water plane in the gravel bed area above the fault line, together with the fact that without Spring Valley diversion there would always be a flow into this area but with the diversion there is a period of no flow almost every year which averages 96 days (Table 1), would indicate that an appreciable local lowering might occur here. As previously stated, this was the area within which the owners of wells complained of the lowering of water level following the initial diversion in 1888 and within which the company deepened several wells at its own expense. (Clough case vs. Spring Valley Water Works Transcript of testimony, pp. 1294-5). The amount of lowering, as indicated by

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the testimony of J. C. Shinn and Ross E. Browne in the Clough case (Transcript of testimony, pp. 1153-4 and 1294-5) and other information could not in my opinion, have been much greater on the average than 10 feet at the end of the dry season. Assuming this amount and a porosity of 25 per cent, the volume represented by the area of 788 acres is 1,970 acre feet. The remainder of the effective Spring Valley diversion of 2,780 acre feet must show its effect west of the fault line. The lower gravel bed area on account of its close proximity to Alameda Creek at the point of crossing the fault line would show the greatest fluctuation. Assuming that the lowering here would be three times as great as over the clay cap area, that the porosity is 25 per cent and that the actual absorption occurs in the gravel area and the lowering in the clay area is transmitted by hydrostatic pressure, the lowering over the 2,985 acres of gravel bed area would be 3.7 feet and over the 17,027 acres of clay cap area 1.20 feet. These annual lowerings of 10 feet, 3.7 feet and 1.20 feet respectively, I regard as being approximately correct for the areas to which they apply.

The effect of the Spring Valley diversion upon the amount of soil moisture available for crops will be considered next. The lowering of 1.2 feet within the clay cap area, in my opinion, has had, if anything, a beneficial effect through drainage of land which was already too moist by reason of a shallow water plane. Within the gravel bed area west of the fault line, the water plane has, in my opinion, always been at too great a depth to be available to the crops which were grown, and the lowering of 3.7 feet would not affect the situation. In the lower portion of the upper gravel bed area just east of the fault line, capillary moisture from the water plane may formerly have been within reach of the roots of orchard trees at least during the spring and early summer. This area is south of Niles and embraces approximately 200 acres of farm land. I am of the opinion that if any land along Alameda Creek with growing orchard was injured by the Spring Valley diversion, it was this area. The balance of the gravel bed area above the fault line has too great a depth to the water plane for trees to be affected by lowering of the water plane.

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Two local residents and orchardists who were familiar with soil and crop conditions along Alameda Creek before and after the Spring Valley diversion testified in the case of Clough vs. Spring Valley Water Works. Mr. J. C. Shinn, living on the fault line between the Southern Pacific railroad and the County Road from Niles to Centerville, and farming acres in that vicinity, testified with regard to the injury to soil fertility as follows:

"I don't think the heavier deeper quality of soil was injured by the Spring Valley diversion in 1888" (p. 1173).

"The lands that I refer to that were injured later by the diver-

sion are low lying lands next to the creek, and the other portion that was not injured, that I did not in my private opinion think would be injured by any diversion, are the deeper, heavy loam soils, more retentive of moisture, where the soil varied from 16 to probably 30 feet in depth. Most of this lies further back from the creek. There is one portion of our land near that creek where it comes within 150 yards of the creek bank, a high bench." (pp. 1173).

Speaking of the use of water on the Shinn Ranch from the W. and M. T. W. Co., Mr. J. C. Shinn testified: "Since 1888 land seemed to need more water. The principal reason was because the trees are older and the roots extend deeper, they make a heavier draft on the soil." (pp. 1454-5).

Mr. Howard Overacker, whose ranch lay about half a mile west of the Shinn property and extended from Alameda Creek to the County Road, testified as follows: (p. 1194).

"The Court: Mr. Overacker, take a piece of land in the vicinity of the creek which never had been irrigated from this ditch (Washington and Murray T. W. Co.), we want to know whether aside from the natural decrease in the fertility of the soil which would come from continued use, whether there has been any difference in the productiveness of the soil from any cause other than that."

"A. Not noticeable by me if there was."

"Mr. Kellogg: Is that up to date?"

"A. Yes."

The only lands which could be characterized as "low-lying lands next to the creek" are those on the lower cone within the clay cap area in the vicinity of Alvarado. These lands, as I have stated before, would be benefited by lowering the water plane. With regard to the 200 acres of orchard land just above the fault line, most of this was irrigated from the Washington and Murray Township Water Co. ditch prior to 1888. Such lands included a portion of the Shinn ranch (Case of Clough vs. S. V. W. W., Transcript of testimony, p. 1437), the Clough ranch (Ibid. p. 1464) and others. The trees and crops upon such land did not therefore depend wholly upon the moisture supplied by the soil from the underlying water plane, the very fact that they were irrigated prior to the Spring Valley diversion showing that the soil moisture from the water plane in its natural position was not very effective. It is my opinion that the detrimental effect of the Spring Valley diversion upon the amount of soil moisture available for crops on lands on Niles Cone, if appreciable at all, is so mingled with the effects of other influences that it would be difficult to separate it.

The damage to land resulting from the increased cost of pumping will next be considered. The use of water on Niles Cone was up until a few years ago confined almost entirely to domestic and stock

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purposes. The dry seasons of 1911-12 and 1912-13 drew the attention of the community to irrigation and many irrigation wells and pumping plants were installed. The future will see further increase in this direction, as the irrigation pumping plant is becoming recognized as a form of cheap insurance against drought. It will be assumed in computing damage that water is to be developed in quantities sufficient for irrigation of the overlying land. The duty of water for pumping plants in Santa Clara Valley has been ascertained to be 1.13 ft. depth per acre annually (Bul. 158, p. 88, Office of Exp. Stations, U. S. Dept. Agriculture) and this duty in my opinion, is ample for Niles Cone.

The increased annual expense of pumping for irrigation results from increased operating expenses due to greater lift, and increased fixed charges due to more expensive plant installation. The operating cost of raising one acre foot of water one foot high for lifts varying from 12 to 140 feet as averaged from various tests by the U. S. Government, principally in Santa Clara Valley, is 7 cents (Bulletins 158, 236 and 254, Office of Exp. Stations, U. S. Dept. of Agriculture). In my opinion this would represent the similar cost of pumping on Niles Cone.

Increased fixed charges might result from the necessity of either deepening wells or installing higher power engine or motor. The greatest depth of the water plane below the ground surface on Niles Cone in December, 1913, at the end of two dry years was about 50 feet. (Water Supply Paper, 345, H, Plate X.) As irrigation wells are usually drilled not less than 80 to 100 feet in depth on Niles Cone, no deepening of wells would be necessary as a result of the Spring Valley diversion. The maximum increased lift of 10 feet on the upper cone would not in my opinion necessitate change in pumping equipment. There would thus be no increased cost due to fixed charges.

Based on a duty of water of 1.13 ac. ft. per acre annually as determined by U. S. Government observations for pumping plants in Santa Clara Valley (Bul. 158, p. 88, Office of Exp. Stations, U. S. D. A.) the increased annual cost of pumping would be as follows:

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Upper gravel bed area, 1.13 x 10 x 7c x 1/2.....	0.40
Lower gravel bed area, 1.13 x 3.7 x 7c x 1/2.....	0.146
Clay cap area, 1.13 x 1.2 x 7c x 1/2.....	0.048

Capitalizing these amounts and applying them to the acreage of riparian land on Niles Cone for which Spring Valley Water Co. has secured rights, the following results:

SPRING VALLEY WATER CO. VS. CITY AND COUNTY OF SAN FRANCISCO

Location of land on cone	Area Ac.	Increased annual cost per ac. due to	Increased cost per ac. capitalized at 6%	Damage for total acreage
		S. V. W. Co. diversion		
Upper gravel beds.....	447.10	\$0.40	\$6.67	\$2,980
Lower gravel beds.....	1,353.55	0.146	2.43	3,290
Clay cap	4,049.01	0.048	0.80	3,240
Total	5,849.66			\$9,510

Applying the amounts to the total acreage affected by Spring Valley Water Co. diversion, the following results:

Location of land on cone	Area Ac.	Increased annual cost per ac. due to	Increased cost per ac. capitalized at 6%	Damage for total acreage
		S. V. W. Co. diversion		
Upper gravel beds.....	788	\$0.40	\$6.67	\$ 5,260
Lower gravel beds.....	2,985	0.146	2.43	7,250
Clay cap.....	17,027	0.048	0.80	13,620
Total	20,800			\$26,130

While the data available for this study is not sufficiently complete to reach accurate figures as to amount of the damage resulting from the Spring Valley diversion, yet in my opinion the amount of this damage is very much less than the sum originally paid by the Company for extinguishment of riparian rights on the cone.
San Francisco, March 24, 1916.

(Attached to Appendix B of Defendant's Exhibit 190 are the following tables:)

Table 1. Analysis of period of flow of Alameda Creek at Niles Dam with reference to the effect of Spring Valley Water Company Diversion on ground water level on Niles Cone.

Table 2. Analysis of Total Natural Discharge of Alameda Creek at Niles Dam with reference to the effect of Spring Valley Water Co. diversion on Ground Water Level on Niles Cone. Quantities in mil. gals.

DIRECT EXAMINATION BY MR. SEARLS.

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In addition to these studies, I have made a study of the valuation of the water rights of the Spring Valley Water Co., based on cost and value of other comparable water rights, and that is set forth in the table which I have before me.

(Memoranda on the valuation of the water rights of the Spring Valley Water Co., based on cost and value of other comparable water rights introduced and marked "Defendants' Exhibit 191".)

“Memoranda on the Valuation of the Water Rights of the Spring Valley Water Company based on Cost of Value of other Comparable Water Rights.

The use of the “market value method in the valuation of the water rights of the Spring Valley Water Co., I do not regard as logical, largely for the reason that there are no recent sales of water rights in the locality from which to ascertain market value. The alternative of attempting to select other localities with similar conditions influencing market value where market value can be ascertained from sales, I regard as equally illogical and as offering no true indication of the value of the water rights under consideration. This is particularly so where the comparison is made with water rights used in irrigation. In order to show the truth of the last statement I have followed out this alternative method to its logical conclusion with the result as set forth in these memoranda.

WATER RIGHTS TO BE VALUED.

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The water rights of the Spring Valley Water Co. here considered are those owned by the Company which were in use in supplying the City and County of San Francisco with water during the period 1907 to 1914, inclusive. These water rights may for convenience be grouped according to the main sources of supply of the Spring Valley system, as follows:

1. Trans-bay or Alameda system, including the right to divert from the natural flow of Alameda Creek at Sunol Filter Beds and to develop sub-surface water from the Livermore Valley gravels at Pleasanton wells. The maximum rate of diversion under these rights is the capacity of the Alameda pipe line. This was between 16 and 17 million gallons daily, prior to 1913. In that year it was increased to a capacity of between 20 and 21 million gallons daily by the installation of a booster pump at Ravenswood. The limit of the right of the company to develop sub-surface water at Pleasanton wells is in my opinion established by the quantity which can be developed annually without materially lowering the ground water level beneath lands in the upper valley not owned by the company. This limit has been exceeded certainly during 1913 and possibly in other years; but in determining the average dependable yield this fact was not taken into consideration. The natural flow of Alameda Creek, reinforced by the water which can be developed at Pleasanton Wells, with existing facilities and rights in the Livermore Valley, is insufficient to maintain the Alameda line at full capacity throughout the year. In determining the quantity to be valued I have not based it on the extent of the legal right of the company to divert through Alameda pipe line, but on the actual average yield which the company can and did divert with the existing facilities during the years in ques-

9694

tion. This quantity is in excess of the safe dependable yield of the system in dry years. The average yield of the water rights of the Alameda system for the period under consideration is the average daily draft on the system during this period. This quantity is 14.7 million gallons daily, less an amount for slippage at Belmont pumps which for average operating conditions may in my opinion be taken at 5 per cent. The quantity to be valued is thus practically 14 million gallons daily.

2. Peninsula System, including the right of storage and diversion of Pilarcitos Creek at Pilarcitos Reservoir and Stone Dam, and the right of storage and diversion on San Mateo Creek and its tributaries at and above, Crystal Springs Dam. The dependable yield of the water rights of the system is the quantity to be valued and is the safe yield of the combined reservoir system. This quantity in my opinion does not exceed 19,000,000 gallons daily.

3. Lake Merced. The dependable yield of this water right is the quantity to be valued and is considered to be the average daily draft for the period under consideration. This quantity is 3.4 million gallons daily.

The total yield of the various water rights of the Spring Valley Water Co. as above determined is 36.4 million gallons daily. If from this be deducted 600,000 gallons per day for deliveries to customers outside of San Francisco on the Peninsula there remains 35.8 million gallons daily as the yield of the water rights in use in supplying the City of San Francisco during the period 1907 to 1914. This is the total quantity to be valued.

The quantities in million gallons per day actually diverted from the three systems during the years 1907 to 1914, as shown on Exhibit 12-U, are as follows:

	1907	1908	1909	1910	1911	1912	1913	1914	Average	1915
Alameda System.....	16.0	13.7	13.5	14.5	15.6	13.2	13.1	18.3	14.7	20.3
Peninsula System.....	11.3	15.4	17.5	16.4	18.8	23.6	21.7	17.7	17.8	18.3
Lake Merced.....	3.4	2.5	3.1	4.7	3.1	2.4	4.9	3.4	3.4	4.0
Total	30.7	31.6	34.1	35.6	37.5	39.2	39.7	39.4	35.9	42.6

9695

Quantities diverted from the Alameda Creek system as given in Exhibit 12-U I understand are measured at Belmont pump and should have a deduction for slippage, which I estimate at 5 per cent under average working conditions.

METHOD OF VALUATION.

The value of the water rights under consideration as determined by the market value method is to be a net value, separate and distinct from the cost of structures necessary to develop the yield and transmit it to the point of consumption. The correct measure of value of

water rights by this method is the net market value of similar rights in the same locality. This value should be ascertained by taking the gross value of the water right selected as comparable, multiplying by the yield of the land and structures necessary to develop the yield and deliver it to the point of consumption. The resulting amount is the net value of the water right which is sought. This in brief outlines the general features of the method as I understand it. This method was followed by Special Master Chinn in valuing the water rights of the Denver Union Water Co. in the recent case of *The Denver Union Water Co. vs. The City and County of Denver*.

9696

The customary method of determining market value in a locality where frequent exchanges occur is by ascertaining selling prices. There have been practically no sales of water rights in recent years in the general vicinity of the Spring Valley Water Company properties. If this method of valuation is to be followed other ways of ascertaining market value are thus necessary.

The alternative method herewith followed is to investigate the values of similar water rights used for irrigation in other parts of California where the conditions influencing market value correspond as closely as possible with those in the locality of the water rights under consideration.

The important elements influencing market value to be considered are, in my opinion, extent of available water supply, relation of demand to supply, and the character of irrigation service which can be rendered. By the latter is meant the relative increase in profit to be derived from the combination of soil, climatic conditions, crop and crop market by the addition of water. As an example of the influence of the character of irrigation upon market value may be cited the statement of Mr. G. G. Anderson (p. 8956 of testimony) that the values of water rights in Colorado are higher where attached to horticultural products than in staple agricultural products.

9697

In my opinion if value in irrigation is to be used as a measure of the value of the water rights of the Spring Valley Water Co. the irrigation service should be similar to that in which the identical rights of the company could be employed. In the report of Special Master Chinn in the case of *The Denver Union Water Co. vs. The City and County of Denver*, the Master in following the market value method in valuing the water rights of the company, distinctly states that he adopted the market price of water rights used in the immediate vicinity of Denver (Par. 28). It is my opinion that as nearly as possible the same procedure should be adopted when going to other localities to determine market value. Especially, do I see no reason for purposely choosing as a basis of comparison water rights used in irrigation in a district where the water supply has been carried to its highest and most valuable development, where such highest and most valuable development is for a use wholly incompatible

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with climatic and soil conditions in the district under consideration, i. e., the district surrounding San Francisco Bay. Irrigated agriculture is a commercial enterprise and water supply used in irrigation can only be carried to its highest and most valuable development where the supply is limited and where because of favorable combination of soil, climate and market, net profits to be obtained from crop sales are the highest. In my opinion the only logical reason for using such a basis of comparison would be the existence of similar conditions in the locality of the water rights under consideration.

Strictly speaking, to ascertain the condition in the locality of the Spring Valley Water Co. water rights such source should be considered separately for the reason that the local conditions differ. For practical reasons, however, the Alameda Creek source will be chosen. The practice of irrigation in commercial agriculture is here growing in favor, the area of agricultural land commanded by the gravity stream is greater than can be supplied if the demand for irrigation water was universal in this vicinity and the probable cost of placing the water on the land is small. With reference to the other sources of the company commercial irrigation on the adjacent lands is either not practiced or is carried on to such a limited extent that a general demand can not be considered as existing. Furthermore the other sources require expensive storage development to develop adequate yields. The conditions on Alameda Creek are favorable for higher water right values in irrigation than on the other sources of the company.

9698

Assuming an active demand for irrigation water on Niles Cone, the conditions to be sought in arriving at a comparable basis for market value are an equally limited available supply, demand for the full volume of the supply and irrigation service in raising crops such as alfalfa and deciduous fruits which are the most important crops irrigated on Niles Cone. The soil and climatic conditions in the vicinity of Alameda Creek are not in my opinion adapted to raising citrus crops on a commercial scale.

Investigation of water right value in irrigation has been extended to several fields in order that the choice of comparable conditions could be made from a broad view of the situation. Investigation has been extended to—

1. Water right values as indicated by the value of shares of stock in mutual water companies operating in Southern and Central California.

2. Water right values in Santa Clara Valley variously determined.

3. Water right values in Central and Northern California as indicated by sales of appropriated water rights exclusive of physical structures.

WATER RIGHT VALUES AMONG MUTUAL WATER COMPANIES.

Southern California:

The development and application of water for irrigation in Southern California is almost entirely handled by mutual water companies. The mutual water company is an association of land owners who have voluntarily organized for the purpose of supplying water for the irrigation of their lands at cost and without profit to any one. The organization is a special form of private company in which stock represents water rights and is owned entirely by those to be served. The profit to be made by the stockholders is derived solely from the sale of the crops produced through the application to the land of the water represented by their stock. Each share of stock represents a proportional part of the available supply. The value of the yield of such company's water rights in use may be approximately determined from the exchanges of stock among stockholders.

The miner's inch is the common unit of measure for water in Southern California and is equivalent to 1/50 of a cubic foot per second. (77.4 miner's inches per million gallons daily). This unit has been used in determining the value of water rights and the result then converted into value per million gallons per day.

The data relative to mutual water companies which is assembled in Tables 1, 1-A and 2 was gathered personally by me and by an assistant working under my direction.

These tables are at the back of the report and show the name of the company and the location as to town, county and the topographic situation; and the crops raised, and the percent of total crops, where there is more than one crop raised; and the duty of water, the approximate cost of the system, the market value of the stock or water rights and the net value of the water rights. The three tables take up Southern California and Central California.

Questioned by Master.

Some of the companies that Mr. Anderson named, I have not been able to get information about, and have not listed those here.

Referring to Table 1, a series of columns headed "Market value of stock, or water right based on sales"; in the first item the amount per million gallons daily in dollars is 6,200. Under the column "Net value of water rights", appears \$2300. That is obtained by deducting the cost of the system from the market value. The market value of the stock of that same company is \$80 per miner's inch, and by subtracting I get \$30 per miner's inch, which is the net value, and which converted into million gallons daily, expressed in dollars, is \$2300. Where the company did not pay for all of its stock, the outstanding bond issues and obligations were deducted

from the cost of the system. This table does not include all the Mutual Water Companies in Southern California. These are the larger ones from which information could be obtained, and are generally typical of the different districts. I attempted to get as complete a list as possible for the different districts in that part of the state, and to cover the different crops raised and other conditions.

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DIRECT EXAMINATION BY MR. SEARLS.

Much of the information was obtained personally from responsible officers of the companies, from records of the companies and from land owners under the system. Information not thus obtained was obtained by correspondence with the ditch company officials, from United States Government reports and from other reliable sources. The twenty-six companies in Southern California for which data is presented in Tables 1 and 1-A include most of the larger ones and I regard them as generally typical of conditions in the various districts in which they are located and sufficiently well distributed to form the basis for Southern California averages.

The physical costs of mutual water company systems are difficult of determination in some instances on account of the inadequate book-keeping methods in use, and the loss of old records. For those cases where it has been entered the data was obtained either from government reports, from the statement of ditch officials or from the company's records. The data was examined to ascertain its reasonableness and probable correctness. The cost of miner's inch of reliable supply was obtained where possible by dividing the cost of the system, less bonded debt if any, by the average supply during the irrigation season. This usually agreed approximately with the product of the similar cost per acre multiplied by the number of acres served by one miner's inch. In cases where data as to the supply was not available either the latter method was used or the equivalent method of dividing the cost less bonded debt by the number of shares.

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The "Net Value of Water Right" is obtained by subtracting the cost of the system per miner's inch from the market value per miner's inch. This quantity represents the value of the water right over and above the capital cost of development and delivery of the water and is the net value of the right to the use.

Inspection of gross water-right values per miner's inch on Tables 1 and 1-A, shows that there are three well-defined classes into which these values fall; namely, companies devoted exclusively to citrus culture; companies raising part citrus and part diversified crops such as walnuts, alfalfa and deciduous fruits; and companies raising only diversified crops such as alfalfa, deciduous fruits, grain, vegetables, etc.

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The companies listed in the tables which fall into the three classes are each of them in my opinion fairly typical of the class, so that averages obtained therefrom would represent fairly accurately the water right value for that class.

Listing the companies of each class in order of gross water-right value, the following is obtained:

9703	1. Exclusively Citrus.	Per m.g.d.
	Lugonia Water Co.....\$2,100 per M.I.	\$163,000
	San Antonio Water Co.....1,950 " "	151,000
	Canyon Water Co.....1,500 " "	116,000
	Del Monte Irrigation Co.....1,360 " "	105,000
	Temescal Water Co.....1,250 " "	96,600
	Gage Canal Co.....1,250 " "	96,600
	Redlands Water Co.....1,050 " "	81,300
	San Dimas Irrigation Co.....875 " "	67,700
	Average\$1,417	\$109,600
	2. Citrus and Diversified Crops.	
	Alta Mutual Water Co.....\$1,000 per M.I.	\$ 77,400
	Thermal Belt Water Co.....1,000 " "	77,400
	Escondido Mutual Water Co.....950 " "	73,500
	Riverside Water Co.....750 " "	58,000
	Santa Ana Valley Irrigation Co.....750 " "	58,000
	California Domestic Water Co.....500 " "	38,700
	South Side Improvement Co.....210 " "	16,200
	Los Nietos Ditch Co.....209 " "	16,200
	Irrigation Co. of Pomona.....208 " "	16,100
	Average\$ 620 " "	\$ 47,900
	3. Diversified Crops, no Citrus.	
	Banning Water Co.....\$612 per M.I.	\$ 47,400
	Moneta Water Co.....350 " "	27,100
	Stout Ditch Co.....175 " "	13,500
	McKenzie Ditch Co.....175 " "	13,500
	Arroyo Ditch Co.....80 " "	6,200
	Imperial Water Co. No. 5.....72 " "	5,570
	Puente Land & Water Co.....45 " "	3,480
	Imperial Water Co. No. 1.....43 " "	3,330
	Little Lake Irrigation Co.....25 " "	1,930
	Average\$175 " "	\$ 13,600

Generalizing the data at hand, gross water right values in citrus culture in Southern California range from \$875 to \$2100 per miner's inch averaging \$1417.

For citrus culture combined with diversified crops, values range from \$210 to \$1000, and averages \$620 per miner's inch.

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For diversified crops with no citrus, the values range from \$25 to \$610 per miner's inch, and average \$175.

From the data at hand it would appear, therefore, that gross water right values in Southern California are highest in citrus culture and lowest in diversified crop farming, including alfalfa, deciduous fruits, grain and vegetables. Values for the combination of the two lie between the extremes.

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Expressed as ratios the average for citrus culture is 2.3 times that for citrus culture combined with diversified crops, and 8 times that for diversified crops exclusive of citrus.

A similar analysis of net water right values results as follows:

1. Exclusively Citrus.

		Per m.g.d.
Lugonia Water Co.....	\$1,995 per M.I.	\$154,000
San Antonio Water Co.....	1,845 " "	142,800
Del Monte Irrigation Co.....	1,173 " "	90,900
Temescal Water Co.....	900 " "	69,600
Gage Canal Co.....	950 " "	73,500
Redlands Water Co.....	677 " "	52,400
San Dimas Irrigation Co.....	665 " "	51,500
Averages	\$1,172 " "	\$ 90,700

2. Citrus and diversified crops.

Santa Ana Irrigation Co.....	\$ 563 per M.I.	\$ 43,500
Alta Mutual Water Co.....	550 " "	42,500
Thermal Belt Water Co.....	550 " "	42,500
Riverside Water Co.....	190 " "	14,700
Los Nietos Ditch Co.....	171 " "	13,200
South Side Improvement Co.....	37 " "	2,860
California Domestic Water Co.....	Negative	Negative
Irrigation Co. of Pomona.....	Negative	Negative
Averages (exclusive last 2).....	\$ 344	\$ 26,500

Questioned by Mr. Olney.

If I recall rightly, the Del Monte, the San Antonio, the Temescal, and the Gage Canal Co. are the same as those that Mr. Anderson considered.

The average of these is \$1,172 per miner's inch, and \$90,700 per million gallons daily as to exclusively citrus; as to citrus and diversified crops the average is, excepting the last two, \$344, and the per million gallons daily \$26,500.

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Among other reasons, the difference in the average result arises from the fact that Mr. Anderson included all their bills payable as a part of their liabilities, tending to enhance the net value of the water right, when he subtracted the assets from the credit side of the balance sheet. I have assumed that the bills payable did not all

represent capital assets, but represented operation charges and other things that I did not believe should be considered.

9706

DIRECT EXAMINATION BY MR. SEARLS.

Referring to page 9 of Exhibit 191, where I have listed two of the Imperial Water Companies: As I understand it, those companies received their water from the California Development Co., and paid a service charge for that water of 50 cents an acre-foot. It is probable that that charge includes a certain profit to the California Development Co., and to that extent the value to the irrigator under a Mutual Water Co., would not be comparable with the others which are listed there, or with the other companies being entirely mutual; there would be some slight additional value, which probably should be added to the value of the stock, if that were taken into consideration. The California Development Co. has been in the hands of a receiver in recent years, and the supposition would be that that profit was not large.

9708

The last two companies are eliminated from the average because of abnormal conditions. The California Domestic Water Co. stock has temporarily depreciated in value during the past eighteen months due to heavy assessments for betterments at a time when there were many young orchards for which the owners had purchased enough stock for irrigation in maturity. This condition, combined with general financial depression, low priced lemons, and the discovery that in a portion of the area served, pumped supplies could be obtained from individual wells has resulted in more stock being available for sale than the demand could naturally absorb. Prior to 1913 the stock was sold at \$95 or \$100 per share, making gross water right values per M. I. about \$1000 and net value \$400.

9709

The Irrigation Company of Pomona has had a similar depreciation which commenced about ten years ago. This was due to local causes, among which was the subdivisions of a portion of the area served for town lots and the discovery that cheap and ample water supplies could be obtained from individual wells over the lower portion of the area served. These various causes have reduced the value of the water right to a figure less than the cost of the system.

3. Diversified crops, no citrus.			Per m.g.d.
Banning Water Co.....	\$483	per M.I.	\$37,400
Moneta Water Co.....	300	" "	23,200
McKenzie Ditch Co.....	171	" "	13,200
Stout Ditch Co.....	157	" "	12,100
Puente Water Co.....	31	" "	2,400
Arroyo Ditch Co.....	30	" "	2,300
Little Lake Irrigation Co.....	13	" "	1,000
Averages	\$169	" "	\$13,080

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Generalizing, net water right values in citrus culture in Southern California range from \$665 to \$2000 per miner's inch, averaging \$1172.

For citrus combined with diversified crops, values range from \$40 to \$560, and average \$344 per miner's inch.

For diversified crops with no citrus, values range from \$13 to \$480 per miner's inch, and average \$169 per miner's inch.

From the data at hand it would appear that net water right values in Southern California are also highest in citrus culture, and lowest in diversified crop farming, and intermediate for the combination.

It is my opinion based on this data and other data and a general knowledge of conditions in Southern California that in this region the value of water rights used in irrigation of citrus crops is much greater than similar value attained in the irrigation of diversified crops such as alfalfa, deciduous fruits, vegetables, etc.

Central California. There are a number of mutual water companies in Central California, practically all of them being in the South San Joaquin Valley. I have obtained information from twenty-one of these companies as shown on Table 2. These companies are well distributed and typical of this section of the state.

Inspection of Table 2 shows that the same classification is possible for gross water right values in Central California as has been made in Southern California. Listing the companies of each class in order of gross water right value the following is obtained:

1. Exclusively citrus.		Per m.g.d.
Lemon Cove Ditch Co.....	\$328 per M.I.	\$25,400
Rosedale Water Co.....	300 " "	23,200
Averages	\$314 " "	\$24,300
2. Citrus and diversified crops.		
South Tule Independent Ditch.....	\$ 66 per M.I.	\$ 5,070
3. Diversified crops, no citrus.		
Bishop Creek Ditch Co.....	\$ 40.00 per M.I.	\$ 3,100
Clark Colony Water Co.....	40.00 " "	3,100
McNally Ditch Co.....	40.00 " "	3,100
Owens River Canal Co.....	40.00 " "	3,100
Roberts Ditch Co.....	15.00 " "	1,160
Watson Ditch Co.....	33.00 " "	2,560
Evans Ditch Co.....	26.00 " "	2,012
Murphy Slough Association.....	25.00 " "	1,940
Rawson Ditch.....	25.00 " "	1,940
Consolidated Peoples Ditch Co.....	11.00 " "	870
Oakes Ditch Co.....	7.50 " "	580
Poplar Ditch Co.....	2.80 " "	217
Averages	\$ 25.45 " "	\$ 1,980

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9711 Generalizing the data at hand, it appears that gross water right values in citrus culture in Central California are much greater than those in diversified crops exclusively.

Comparing Southern and Central California water right values, it appears that in citrus culture gross values are five times greater in the South than in Central California. For diversified crops with gravity water, values in the South are three and one-half times those in Central California. This difference of value in my opinion is due among other reasons to the more favorable water supply conditions in the San Joaquin Valley, both as to amount and diversity of supply and cost of development.

Information regarding the cost of many of these systems is very meager and no attempt has been made to average net water right values, except to note that it is less than the gross value.

It is my opinion that in the San Joaquin Valley as well as in Southern California the value of water rights used in irrigation of citrus crops is much greater than similar values attained in the irrigation of diversified crops.

Application of data to Spring
Valley Water Co. water rights.

As before stated the conditions to be sought in arriving at a comparable basis for determining the market value of water rights on Alameda Creek are; equally limited available supply, demand for the full volume of the supply and irrigation service in raising crops such as alfalfa, deciduous fruits, etc. I have given the matter considerable thought as to what districts and companies among those listed above most nearly corresponded with the conditions sought. It is my opinion that the diversified crop groups offer a proper basis of comparison with regard to the irrigation service which can be performed. With regard to the elements of supply and demand the Southern California group companies devoted to diversified farming offer the best comparison, if it be assumed that irrigation is universally considered as necessary on Niles Cone, although if the actual need for irrigation be considered, possibly the Central California values are more comparable.

9712 Viewed from all points it is my opinion that the Southern California companies engaged in raising diversified crops afford a fairly comparable basis of comparison for market value of water rights on Alameda Creek. Based on the data presented herein and a general knowledge of conditions it is my opinion that water rights in Southern California in this service have a general average gross market value of \$200 per miner's inch or \$15,500 per m.g.d.

I might say that the \$200 is obtained from averaging the companies on page 9, excluding the Imperial Water Companies. The average with the Imperial Water Companies is \$175. The average

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of \$200 is of the companies excluding the Imperial Water Company No. 1 and the Imperial Water Company No. 5.

This also represents the gross value of the yield of water rights on Alameda Creek used in irrigation.

The net value of Alameda Creek water rights used in irrigation on Niles Cone is the difference between the gross value and the cost of lands and structures necessary to develop and deliver the water to the edge of the farm. The cost of an irrigation system for 9,300 acres lying adjacent to Alameda Creek and consisting of a diversion works, pipe line and open concrete lined ditches I have estimated in detail as \$150,835 or \$16.20 per acre. At a duty of 1.4 acre feet per acre and a seven months irrigation season the area served by one miner's inch is six acres. The cost per miner's inch is thus \$97.20, and the net value of the water right per miner's inch \$102.80, or \$7,950 per m.g.d.

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Questioned by Mr. Olney.

On page 11 there is \$13,080 as the average of the net value in Southern California for diversified crops, but in computing it on Alameda Creek, I deducted the actual cost of a diversion system there necessary. Instead of taking the average for Southern California companies for the net value, I took the average for the gross value, and then deducted therefrom the actual cost on the Alameda Creek. In getting at this net value of the Mutual Companies in Southern California, I had already deducted the amount of their structures. The point is that the cost of structures varies with each individual company, depending on the topographical and other features, so that an average obtained in that way would hardly seem to be a scientific average. The topographic features, which control the cost of development, and the hydrographic features of the country, vary without any law or reason; a net value obtained by such an average would seem to me could not be used either locally through a large territory, or taken bodily and used in another district.

Questioned by Mr. Searls.

The gross value represents the value to the user of the water. It depends on the crop he can raise, upon soil conditions, upon climatic conditions, and upon the market conditions, for his crop. Gross value is controlled by general conditions existing in that district and community. On the other hand, the net value would differ with each company in a district, depending upon the cost of developing the water for that company; the distance from the land to be served from the source of supply, and the expense that would be undertaken in developing the source of supply.

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The rights to which this value applies are in most instances in use during 7 to 9 months of the year. The rights of the Spring Valley Water Co. are used throughout the year. On the other hand, irriga-

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tion is a necessary aid to agriculture in Southern California, while, in the vicinity of Alameda Creek it is not generally considered necessary and where practiced is regarded as being in the nature of an insurance against drought. The latter fact would tend to produce a lower market value of water rights used in irrigation than in Southern California. Taking all facts into consideration it is my opinion that the net market value of water rights similar to those of the Spring Valley Water Co. as determined by comparison with water right values among mutual water companies where conditions are on a comparable basis, is not in excess of \$8,000 per m. g. d. This is not my opinion as to the value of these rights for rate fixing purposes but is the result of what I consider as the correct application and working out of the method of comparison with values and sales in other localities.

WATER RIGHT VALUES IN SANTA CLARA VALLEY

Information relative to water right values in Santa Clara Valley for irrigation purposes is as limited as in the immediate vicinity of the Spring Valley Water Co. properties. In this connection, however, the testimony of Messrs. Anderson and Herrmann relative to this subject will be commented upon.

Mr. Anderson followed two lines of investigation; first, he assembled data as to the cost of water for irrigation from pumping plants and from gravity ditches, and then attempted to compute the value of a water right by capitalizing this cost; second, he attempted to determine the enhanced value of land through the application of water by capitalizing the annual cost of water per acre.

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The first method apparently assumes that the value of property in use can be determined by capitalizing the annual cost necessary to make the property produce a revenue. This method I consider does not show the value of the water right any more than would the capitalized cultural cost of producing a crop show land value, or the capitalized cost of repairs, taxes, etc., on a house and lot show their value. The result obtained by Mr. Anderson represents to the irrigator the value of water service plus the value of the water right, if any. If the capitalized operation and maintenance cost be deducted and the cost of the structures necessary to make available the yield of the water right the remainder might be considered as representing water right value. The final result after these deductions are made would under conditions in the Santa Clara Valley be a very small amount.

Considering next the enhancement in land value, Mr. Anderson apparently assumes that the enhanced value of land with water as compared with land without water can be determined by capitalizing the annual cost of the water necessary to irrigate the land. This

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method I consider does not show the enhanced value of the land any more than capitalizing the annual cost of fertilizing land would give the increased agricultural value of the land, or capitalizing the increased cost of taxes and upkeep on an enlarged building gives the increased value of a building and lot. The result obtained by Mr. Anderson represents the value to the irrigator of the water service plus the enhancement of land value if any due to application of water. If, as before, the capitalized operation and maintenance cost and the cost of structures be deducted the remaining value would probably be found to be very small under conditions in the Santa Clara Valley.

With regard to the enhancement of land value in Santa Clara Valley of \$250 per acre which Mr. Anderson reports as generally occurring with the application of water, I understand that the actual enhancement is much less than this.

Generally speaking, the reported enhancement of land values resulting from the application of water, when carefully analyzed, are found to be the resultant of a number of influences the individual effects of which it is impossible to segregate.

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The foregoing comments apply to the testimony of Mr. Herrmann as far as he adopted the results of Mr. Anderson's investigations in Santa Clara Valley. With regard to the sales of water rights in Santa Clara Valley reported by Mr. Herrmann they are all for small quantities of water and in my opinion are not on a comparable basis with the Spring Valley Water Company supply.

WATER RIGHT VALUES IN CENTRAL CALIFORNIA AS INDICATED BY SALES OF WATER RIGHTS EXCLUSIVE OF STRUCTURES AND LANDS.

The sales of several water rights in the Sierra Nevada foothills of Central California have been investigated as affording some information as to market value of water rights in that region. In view of the growing demand for water for municipal uses in the bay region and the consequent increased radius to which the local market extends, some consideration at least should be given to market value in this region. My investigation at this time has extended principally to one purchase although incomplete data have been available on a number of purchases.

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Questioned by Mr. Searls.

I had access to certain data relative to the sales of water rights in Northern California in possession of H. H. Henderson, and the conclusions which I drew from that data are those stated on page 19 of Exhibit 191. The conclusions which I formed from Mr. Henderson's data were that water rights commonly sell, exclusively of lands or structures, in the Sierra foothill regions of Central and Northern

California, at prices ranging from \$3,000 to \$4,000 per cubic foot per second, on down to lower amounts. These maximum prices are equivalent to from \$4,500 to \$6,000 per million gallons daily.

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SUMMARY

As a result of the foregoing review of market value, and cost of water rights used in irrigation, it is my opinion that based on use in irrigation the water rights of the Spring Valley Water Co. could not exceed the sum of \$8,000 per million gallons daily, or multiplied by the yield of 35.8 million gallons daily, the total sum of \$286,400.

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In the foregoing three analyses I have given the original cost of the Spring Valley Water Co. water rights, the estimated cost of reproduction and a valuation showing that the valuation per million gallons would be, based upon the market value of water rights used in irrigation under similar market conditions in other localities. To my mind the original cost of the water rights furnishes the fairest basis for estimating the value of these water rights for rate-fixing purposes.

The reproduction cost as I have estimated it gives an amount less than the original cost, due largely of course to the fact that the company appears to have gotten practically nothing in the way of water rights for some \$800,000 of the \$1,000,000 paid for the Alameda Water Company purchase and the \$150,000 paid the Lake Merced & Clear Lake Water Company. This method is not entirely satisfactory to me as applied to the reproduction of water rights because it inherently involved more or less speculation and assumption which unavoidably leads to widely divergent results

The valuation of the rights based upon market value of similar rights is equally unsatisfactory. The entire absence of water right sales in the vicinity of the Spring Valley Water Company properties renders the normal application of the method impossible. The attempt to ascertain market value of similar water rights under similar market conditions in other localities offers as wide an opportunity for speculation and assumption as does the reproduction cost method.

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Furthermore, if these water rights are to be compared with rights in other localities for the purpose of valuation I believe that the only fair basis for comparison is to select similar market conditions, involving not only a demand for the full supply in a limited supply but involving also soil products which are comparable in value. Taking these three factors into consideration I find that the value of the Spring Valley water rights does not in my opinion exceed \$8,000 per million gallons daily or a total of \$286,400, which is far less than the original cost. For this reason it would obviously be unfair for the company to adopt such a value.

The original cost of the Spring Valley water rights as a basis of valuation for rate fixing, has a number of elements in its favor. Its

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amount can be ascertained with reasonable certainty, thus removing it from the realm of speculation. It is just to the company and protects it in its investment. It is not unfair to the consumer. It involves no element of uncertainty as to basis of comparison with other water rights.

There is also to be considered the influence in recent years of legislation and the governmental control of public utilities. The modern tendency both as expressed in legislative act and in the decisions of the State Railroad Commission has been toward original cost as a basis of value for water rights. The State Water Commission Act now in effect contains a clause providing that permits to use water or rights granted under the terms of the act shall not be assigned any value in excess of the actual amount paid to the state therefor either in connection with valuations for rate fixing purposes or for sale to the state or any city or district. The State Railroad Commission has adopted original cost as a value for water rights in at least one rate decision (Decision 1534, San Jose Water Co.) and probably in others including a valuation for sale and condemnation. With the relative power exercised by this commission over public utility rates and sales of public utility properties these tendencies cannot but have their influence in establishing first cost as market value.

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After careful consideration of the subject it is my best judgment that the original cost of the water rights of the Spring Valley Water Company represents the fairest basis for estimating the value for rate fixing purposes. I have estimated this value to be \$1,932,988.82 up to December 31, 1913. If this amount be divided by the yield of the water rights, 35.8 million gallons daily, a result of practically \$54,000 per million gallons is obtained. Expressed as totals, my best judgment of the values for rate fixing purposes of the water rights of the Spring Valley Water Co., for the various years under consideration in this case is as follows:

Year	Amount
1907.....	\$1,756,525.82
1908.....	1,756,525.82
1909.....	1,756,525.82
1910.....	1,766,301.30
1911.....	1,925,964.32
1912.....	1,912,671.32
1913.....	1,932,988.82
1914.....	1,932,988.82

The Master: I am correcting on the face of the transcript, at page 9619, with reference to the year 1914, so that it shall read, \$1,932,988.82.

Questioned by Mr. Searls.

9730 I did not consider the assessed value of water rights in Alameda County against the Spring Valley Water Company as any particular indication of the fair value of those rights, because it did not seem to me they were ascertained in a scientific manner, or with the intention of getting the fair value of the property. I understand that the Assessors of San Mateo and San Francisco Counties have not put any assessment on the water rights.

Questioned by Mr. Olney.

The total assessment in Alameda County alone was \$3,000,000, and at the same rate, applying that to all the water rights of the company, it apparently would make about \$6,000,000 for water rights.

Questioned by Mr. Searls.

9731 From my knowledge of coast streams, and from what data I have been able to obtain on this subject, I think that a considerable portion of volume of the water which flows down San Mateo Creek might be termed flood flow water. There is no accurate data on which a dependable measurement could be made over a series of years. I do not consider prices paid for from 1 to 10 miner's inches of water any indication of the price that would be paid for from 30 to 40 million gallons. I consider that the amount is too small to be comparable at all with water in such magnitude as is the Spring Valley system. The waters of Calaveras Creek, and of San Antonio Creek, in my opinion could not be used upon the riparian lands above Sunol Dam in sufficient quantity to materially reduce the flow available at Sunol Dam, and with regard to the Arroyo Valle, the waters there could not be so used.

CROSS EXAMINATION BY MR. OLNEY.

9732 My final conclusion was that the original cost of these water rights was the fairest figure to use as their value for rate-fixing purposes, and in 1913 I fixed that original cost at \$1,932,988, and I regard that as the proper value in that year for rate-fixing purposes. In getting that figure I did not take the cost of the lands. I took the estimated damage to those lands, which has, in my opinion, resulted from the operations of the company. I did not consider original cost of the lands. In my opinion the amount which I did consider represented what would have been the original cost of water rights. Their purchase price does not represent water rights alone, but water rights and land, the latter of which is not necessary for the maintenance of the water rights.

9733 My estimate in the year 1913 of the original cost of the water rights of the company, exclusive of the Pleasanton lands, are rights entirely, and would be the figure \$1,932,988, less the figure of \$122,000. In other years what might be termed the North Pleasanton Well Tract, an estimate has been included for that.

When I stated that the total flow of San Mateo Creek was in the shape of flood waters, what I had in mind was the physical fact

that the large part of the flow of the stream—taken the year around—during storm periods is flood water, and it is wild, and is not subject to diversion, and control, by the ordinary means which the riparian owner would have at his command; it is not water which he could put to use. All the information which I have in regard to the stream flow of San Mateo Creek is the measurement of Mr. Schussler, which was made at Crystal Springs in the low water flow period; this together with my general knowledge of streams of that character. If I recall correctly, that was taken in the year 1871.

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The flow of Pilarcitos Creek is somewhat more normal, due to the more heavy timber and brush covering of the stream, and also to some extent due to the geological formation; from all the information I have been able to gather, and from my own observation of the stream on two or three occasions during the past 18 months, I should say that the normal summer flow of Pilarcitos stream was greater in amount than the San Mateo stream, and therefore what might be called the relative proportion of the flood flow to the normal flow of the stream was not quite as great as on San Mateo Creek. In other words, the stream is somewhat more regular in flow. It is my idea, assuming there were no diversions, whatever, either from San Mateo Creek or Pilarcitos Creek, that the summer flow of Pilarcitos is larger absolutely than that of San Mateo. I would not attempt to state it in figures. There are a very considerable number of tributaries coming in below the Spring Valley point of diversion. Taking the point of diversion at the Stone Dam, I have nothing to base any opinion on as to whether the normal summer flow of Pilarcitos there would be more than that of San Mateo Creek. In general, the summer flow would be relatively somewhat larger than on San Mateo, but I could not attempt to state any ratio without data. I could not state any positive ratio as between Pilarcitos at the Stone Dam and the San Mateo Creek at Crystal Springs during the summer. I could state that the summer flow of Pilarcitos Creek at the Stone Dam would be relatively greater in proportion to the total flow of the stream throughout the year at that point than would be the summer flow of San Mateo Creek relative to its total flow; in other words, I can give a ratio relative to the stream itself, but not with reference to one stream to the other. I could not give that in figures. Those are matters that could only be determined by actual measurements, and I do not believe those measurements are available.

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The normal summer flow of Alameda Creek without diversion is shown by Exhibit 187. During the months of May to September the average is about 17 million gallons a day. I may be in error about that, but I remember I had the thing worked up. I had that worked up excluding the Pleasanton well development.

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In the month of May, 1893, the average flow of the stream was somewhere in the neighborhood of 70 million, and up to 120 million gallons a day. In the month of May, 1892, it was up around 40 or 50 million. In the month of May, 1891, it was up around 60 million. The months of May and June are both of them much larger than 17 million. The total flow of the stream includes both the Spring Valley diversion and the waste over the dam. If the months of July, August and September are considered, the normal summer flow of Alameda Creek would be less. As a general average it would be up around 7 or 8 million, I should think, from an inspection of the diagram.

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ONE HUNDRED AND THIRTY-THIRD HEARING.
APRIL 10, 1916.

Witnesses: EZRA BENJAMIN WOOD for Defendants.
CHAS. H. LEE for Defendants.

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(A joint exhibit on buildings outside of the city and on flumes introduced and marked "Plaintiff's and Defendants' Joint Exhibit 192".)

(The agreement on the segregation of expenses and roads and planting were introduced to be inserted in the Joint Exhibit 179.)

9741-9743

(Certain corrections noted in the transcript.)

9744

Witness: EZRA BENJAMIN WOOD for Defendants.

Wood

DIRECT EXAMINATION BY MR. SEARLS.

I am 46 years of age, and reside in Oakland. I am a cream buyer for the Western Creamery Co. Prior to two years ago I resided most of the time at Modesto, and I was raised on the Wood Colony Tract. I lived there from the time I was born until I was 24 years old, and I think that was in 1894. Since that time I have kept myself generally familiar with the history of the tract, and I am familiar with two or three sales there. At the time I resided on the tract there was no water on it for irrigation purposes. After I left it, the tract went back to the original owner, Mr. Page, who sold it to A. B. Shumate and Orrin McHenry. They surveyed it and subdivided it into 40-acre tracts. Shumate told me they paid \$28 an acre. They did not apply any water to the land, but the ditches were being built, I think, when they made the purchase. When the subdivisions were first put on the market I think they commenced selling at \$40, and then advanced it to \$45, and then to \$50. I only know of one re-sale in subdivisional

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tracts; Mr. McLain purchased the 40-acre tract adjoining an 80-acre tract he purchased from Mr. McHenry for \$50 an acre. This tract was pretty close to the main canal, which I think was on the south of it.

A Mr. Clark made a purchase at \$45 an acre on the south side of the Wood Tract, just before the water was put on it. A Mr. Vierra purchased a piece of land there either in 1907 or 1908. The land was all in alfalfa, with a fairly good house on it, and good improvements. It was a 40-acre tract, and he paid \$8,000. I don't know of any particular sale since 1908. I know of an offer to sell a 56-acre tract at the present time. The price is \$125 an acre. The executrix of the estate, which is the C. A. Post Estate, is Mrs. W. H. Wood, my sister-in-law. This property is not in the Wood Tract; it is situated on the south side of the Tuolumne River in the Turlock Irrigation District. I don't know of any land for sale in the Wood Tract. About six or seven years elapsed between the time that this land was sold with water on it at \$50, and the time at which, with improvements, it was sold for \$200 an acre. I think the water was put on the land in 1901, or along there. We always considered that the Wood Tract developed much faster than any other portion of the country there. After they got water, they planted different crops than they had before. It developed first into alfalfa mostly, and then some of it developed into fruit. There might have been a few fruit trees around the house on the tract which sold for \$200 an acre in 1907. There were a number of dairies on the Wood Tract at that time.

CROSS EXAMINATION BY MR. MCCUTCHEN.

I think \$25 an acre would plant alfalfa on this particular land that sold for \$200 an acre at that time. Alfalfa seed was much cheaper then than it is now. All but the portions where the buildings were were planted to alfalfa at that time. I saw that land, I think, not more than three months ago. Previously to the sale for \$8,000 I had seen it within a year's time. I could not say how long it had been planted to alfalfa before the sale at \$200 an acre was made. It was in alfalfa when I had seen it a year prior to the time when it was sold. It was an excellent stand of alfalfa at the time of the sale, and I would say it would take two or three months to get an excellent stand of alfalfa after planting. I have seen some tracts of land produce better crops the first year than at any other time, and I attribute that to the soil a great deal. It is a question whether alfalfa enriches land rather than depletes it. In the Gridley Country, we have the best crops of alfalfa produced the first year it is planted. That is not true of the Modesto country that I know of. I would not say that the crops of alfalfa are better in the Modesto country after the first two or three years than they are in the first year. I have seen alfalfa plowed up there that was three years old. I don't think it was because of gophers. I always

attributed it to being pastured by stock. I cannot say that I consider it due to any deficiency in the land. It is rather due to the treatment the crop has received.

9751 This one case in the Wood Tract is the only sale of any land that was good for alfalfa that I know of selling in that country for \$50 an acre after it was assured of water. I don't know why that one piece of land sold for \$50 an acre after it was assured of water. Water was in the Wood Tract at that time, as I know from being told, not from having seen it. I was told about it a year after the water was put on the land. Land was sold for what we considered an excessive price at the time, due to the class of buildings that were placed on the land. The class of the buildings regulates the price of the land very much there.

9752 I don't know what alfalfa lands sold for in that particular locality in 1912 and 1913. There were sales there at more than \$200 an acre, but the class of buildings regulated that a great deal. I cannot recall the sale of any tract of land there on which there was alfalfa and no buildings.

9753 In what they call the Shiloh School District there was a tract of land sold for \$125 an acre. Just prior to the time of water going on the land I suppose that land would sell for \$20 an acre. It was a lapse of 10 years before the market price advanced to \$125 an acre after it was assured that water was to go upon the land. It took some time for that land to advance. We had all kinds of problems, and the irrigation district was held up for 10 or 12 years. The time the irrigation district was organized, the land values jumped very much, and then they decreased until they got down to about \$25 an acre. They decreased owing to the litigation of the district; that is to say, because land owners had been disappointed in their anticipation of getting water within a very short time. I don't think that those lands advanced 500% in a period of a couple or three years after it was assured that they were to get water. The advancement was very slow in prices there. The people down there don't think they have water enough now to produce crops. I think that those lands would go above the prices at which they are now ruling if it were assured that they were going to receive all the water that they could possibly use for the production of crops. The advance in prices would be due to the fact that they were to receive the water.

9755 I don't think there is any land in that particular locality that is not improved. I don't know of a bare piece of land in that territory that is for sale. It is my opinion that \$100 an acre would be the market value today of those lands assured of water and not planted to alfalfa, but I think the land was worth more than \$25 an acre without water on it for the purpose of raising grain. In 1884 the Wood Tract sold for \$48.50 an acre, and it fell to \$25 an acre on account of lack

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crops, bad years, the price of wheat. They were then undergoing this litigation in regard to the irrigation district, and that was the cause of a number of sales there. I don't think the land could be bought for \$25 an acre because of the uncertainty of a supply of water with reference to it. The reason was lack of crops, which was due to the fact that we did not have enough moisture. I don't think the price would have fallen much below \$50 an acre if we had had crops. I am sure there was not any land sold for \$100 an acre within three years after water came on there that was not planted to alfalfa and demonstrated and proved.

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I know of some sales in Stanislaus County, and the general prices asked for lands under irrigation systems within the period of years just prior to 1913. In 1884 there was a piece of land sold at Salida for \$70 an acre; it was known as the Davis Tract. In 1884 the Wood Tract was sold for \$48.50 an acre. The Wood Tract was sold, and reverted back to Timothy Page on a mortgage.

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I never heard of the Buckley Tract, but I do know of the Dickerson property. I do not know the price at which the Dickerson Tract was taken in by the San Francisco Savings Union. There is no portion of that tract under water today. I would say that tract is worth about \$3 an acre, and water could not be applied to it as it is very hilly. It is east of Montpelier. I don't know of any tract that was owned by Dickerson that was mortgaged to the San Francisco Savings Union, consisting of property that was on the level. I cannot recall any other large tracts down there that were taken by the mortgages, and that afterwards came under any one of these irrigation systems.

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I know of one tract on the south side of the river, in the Turlock Irrigation District, that belongs to Mayes & Wren, and which has subsequently been subdivided. I know of one 40-acre tract that is offered for \$6,000 which is improved in alfalfa. That land, prior to the delivery of water, would have sold for \$25 or \$30 an acre, or possibly \$40 an acre. The delivery of water to those lands might have improved them from 150% to 200%. I never recognized \$25 an acre as the true value of the land. The Wood Tract was the lowest priced land that I know of, \$20 an acre, which was the price within a few years of the time when water was delivered to it. Ten years before the water came there was lots of land sold for \$45 and \$50 an acre, and some of it as high as \$70. I don't think that land became exhausted for wheat. The Wood Tract produced wheat right up to the time that water went on it, and in fairly good quantities. The last two years they raised wheat on it I think were the best crops they ever produced. It was a matter of common knowledge that Stanislaus County lands were almost exhausted for winter plowing wheat; where they summer fallowed their land it produced wonderfully. The lands fell to \$25 an acre from \$45 or \$50, due I think, to litigation, and not so much to the failure

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of the land to produce good crops. I never knew of the failure of a summer fallow crop in Stanislaus County. They did not require so much moisture to produce summer fallow crops.

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RE-DIRECT EXAMINATION BY MR. SEARLS.

The Mayes & Wren Tract, in the Turlock Irrigation District, 40 acres, is now being held at \$150 an acre, or \$6,000. Water was put on it about 1901, I think, so that there is a lapse of about 14 years between the time it was worth \$40, and the time it was worth \$150 an acre. The country is pretty well settled now.

9763

RE-CROSS EXAMINATION BY MR. MCCUTCHEN.

If that land were shorn of its right to water, it would be worth today \$40 or \$50 with the improvements on the place. It was used for dairy purposes, but could not be so used if it were shorn of its right to water. I don't think that land which can be bought for \$150 an acre, planted to alfalfa, would support one cow per annum per acre, although it is fairly good land. I never have seen any land in any of these irrigation districts planted to alfalfa that does support one cow per acre per annum, and I don't think any of that land will support one cow per acre per annum. I could not say that I am influenced by that understanding in the values which I have fixed upon lands in those irrigation districts.

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Questioned by Mr. Searls.

I have thought a great deal on the question of whether that land would, or would not, support a cow to the acre.

RE-CROSS EXAMINATION BY MR. MCCUTCHEN.

I am in the creamery business, and it is incidentally a part of my business to know how much is required for the support of an animal. I know of but one alfalfa ranch in California that actually supports a cow per acre per annum. That is just below Nicholas, which is on the Sacramento River. I don't know of any ranches in these irrigation districts where the owner keeps a number of cows equal to the number of acres which he has in alfalfa, without buying alfalfa. I state that from facts I have gained in talking with different men who dairy. My experience in Stanislaus County has been about 30 cows to a 40-acre tract. We usually figure that a good cow will produce about 300 lbs. of butter fat a year. We have had average prices of 27 cents, and we have had average prices of 35 cents, or a variance of 7 cents per lb. in butter fat.

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The bankers of that county will not lend \$60 or \$75 per cow and take a chattel mortgage on the cow. The company I am with has something like \$28,000 loaned in the vicinity of Modesto, and it is very, very rarely that they will give over \$30 a cow. There have been some

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instances in Stanislaus County where there was \$100 lent per cow, but that was in special cases, and for special purposes.

Questioned by Mr. Searls.

The town of Nicholas, on the Sacramento River, is about 12 miles below Marysville, and that man at Nicholas produces 20 acres of alfalfa and 20 acres of corn.

Witness: CHAS. H. LEE for Defendants.

Lee

DIRECT EXAMINATION BY MR. SEARLS.

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This table is the monthly discharge of Alameda Creek, exclusive of Pleasanton Wells for the six summer months, June to November. The flows for these months have been arranged each year in order of their magnitude. It is from 1890 to 1914, with the exception of the years when the record at Pleasanton Wells is missing. On the averaging of the months of lowest flow, the last column on the right indicates a flow averaging five million gallons a day, with some months of three million, two million, and even one million gallons a day, but making up this average as well as greater than five millions a day forming the average. The one just preceeding that averages six million for the whole period, though some months have flows as low as two million gallons a day. The period of the fourth greatest flow averages seven million for the whole period, with some as low as two million gallons a day there.

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Looking over the table and the study in "Exhibit 189", page 6, I find that on the front foot basis, if the flow in the stream is less than five million gallons a day that one or two of those parcels there will have a share less than what the company has agreed to deliver, so that on that basis I made a detailed examination for every month to ascertain what the total for the 18-year period would have been, the total amount that the company might have had to deliver over and above the riparian share. Capitalizing this amount at the same rate used by Mr. Anderson, I find that the agreed total burden would amount to 1,650; that is the capitalized amount. This amount in my original study of the matter, although I did not work it into an exact figure, I had in mind that it was a small amount of this sort, and would be covered within the 5% which was added to the whole estimate of original cost for items which might have been excluded. If the estimate had been made on an acreage basis, it would have been a little smaller.

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(These sheets were attached to Exhibit 189.)

(Certain corrections noted in the transcript by Witness Lee.) 9789-9791

Mr. Lee: If I were to assume that the tract of land in the Santa Clara Valley had increased \$50 per acre as a result of the application of water, and that the application of water was 1.13 of pumped water,

that would correspond, on the basis of a 7 months irrigation season, to \$29,000 per million gallons per day.

CROSS EXAMINATION BY MR. MCCUTCHEN.

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The first piece of engineering work that I recall after my graduation, where I was entirely independent of directions from another engineer, was the work which I carried on for the State Conservation Commission for the State of California. That was in 1912, and consisted of an investigation of the possibilities of spreading flood water on the gravel cones of Southern California streams, with the possibility of increasing ground water supply. The specific problem was to ascertain whether flood water spreading, which has been done in past years, had accomplished the results desired. This investigation was in the San Bernardino Valley, near Redlands and Highlands, and San Bernardino, and in the San Jacinto Valley, and on Lilac Creek. Some investigations were also made in the vicinity of Santa Ana, and the coastal plane south and southeast of Los Angeles.

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In the San Bernardino Valley it was a study of the work done in the past 10 years as to the amount of water that had been spread; a study of the flow of streams contributing to the gravel basin; a study of well records, both within and without the artesian basin, and of the rainfall—the variations in the district; a change in the surface characteristics, the shrinkage in the evaporated area, and all matters that related to the problem at hand. I found there had been a decrease in the shrinkage of the evaporated area in the San Bernardino artesian basin up until the year 1904 or 1905; following that for a few years there was very little change, but beginning in the year 1911 and 1912, the area which had shrunk up to 1904 began to expand again. I attributed that to the greatly increased absorption of the gravels during a period subsequent to 1905 due to greater rainfall and run-off than in the preceding 8 or 10 years. The Conservation Commission was only concerned with the problem as a general problem, and as that was a district where work of that type had been carried on most extensively, it was chosen as probably affording the best opportunity to study that method for the purpose of forming conclusions as to the possibility of the application of that method in other districts.

9794

That method had been applied to the San Bernardino artesian basin for over 10 years prior to the time that I went there to investigate the matter. It was carried on first under the direction of the Gage Canal Co., or possibly the Riverside Trust Co., they are related; then later under the direction of the Riverside Water Co.; an organization had been formed there called the Water Conservation Association, which was formed by the leading ditch companies, the Riverside Water Co., the Gage Canal, the Anaheim Union Water Co., and the Santa Ana Valley Irrigation Co. The last two took their water from the stream

a number of miles below there, but they were all interested in the same stream. The Riverside Water Co. took its water from artesian wells largely, which are located in the heart of the basin along Warm Creek. This stream was one of the large tributaries of the Santa Ana. This stream is one of the large tributaries of the Santa Ana, rising from the artesian basin, and entering the Santa Ana River down near the lower part of the basin. The Riverside Water Co. had other rights which it drew upon, I believe, some of them older ditch rights; the main source of supply was these wells, and the Warm Creek flow. The interest of the Water Conservation Association, and the ditches that were organized together in connection with that work was to replenish the supply of ground water so that wells and streams rising from the artesian basin would not become depleted in the periods of drought which are customary to occur at long intervals in that region.

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If I recall rightly, Mr. Hazlett, engineer of the Rio Vista Water Co., did most of the engineering for the Association. The State Commission was desirous of obtaining information, and the report which I made was published for public information on the subject. The work that I did in that particular locality was simply the gathering of information which was put in the form of a paper, and the same is true of the other work I did under the direction of the Conservation Commission. There was also a great deal of study put into the matter after the information was gathered for the purpose of forming conclusions. After I had gathered this information, the report was published, and became public information for the use of anyone who desired to use it. It was only intended to be put in the form of a publication, so that those of the public interested in the question could get the result of my study.

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A somewhat similar study was made of the ground water supply of the Indian Wells Valley in Kern and Southern Inyo Counties. This valley is situated north of Mojave, the towns of Brown, and Inyo-Kern are situated in that valley. A number of settlers there are planning using those waters for irrigation, and I don't think they have ever been used for irrigation. The use has been largely domestic, although in a few cases irrigation has been attempted, but I do not believe it has been successful. There were a number of settlers, some of them living there, but most of them still doing their assessment work on desert entries, and not residents at that time. I have not done any other work for the Conservation Commission.

9797

In recent years I have made an investigation and study of water supply conditions at Fort Stanton, N. M., independently of other engineers, and a general hydrographic survey of the Rio Bonito, in connection with the adjudication of water rights. This work extended over some 40 miles in length on the Rio Bonito, with a great number of ditches diverting. The work involved the determination

of the amount diverted and areas irrigated, and the capacities, and a very complicated study of the relation of the irrigation therefrom upon the stream flow, and also of diversion at the head of the stream by the El Paso and Southwestern Railway from the south fork of the Bonito through a pipe line.

9798 A flood flow of the Rio Bonito is of 2,000 or 3,000 second feet at the upper end of the stream; at the lower end it is very much larger; the normal, or minimum flow of the stream in the dry season is in the neighborhood of 6 or 7 second feet, or possibly a little lower on the upper part of the stream. I was not employed by an irrigation company there. I was employed by the United States Public Health Service. They desired a full knowledge of the irrigation on that stream, and of the character of the flow of the stream, and of the effect of the diversion by the El Paso & Southwestern Railroad upon the supply for the sanitorium, which was obtained from the stream. Also they desired advice as to the best method of supplementing their diminished water supply which had apparently been diminished by diversions by the El Paso & Southwestern Railroad. I started the work in 1912, and just finished a final report on the matter some few weeks ago. I advised as to the possible means of improving the situation there, but was not directly employed in the acquisition of water rights.

9799 When I speak of storage lands, I mean lands which could be used as a surface storage site. I was also engaged independently of the direction or advice of other engineers upon an investigation of the water supply for a mining property in Inyo County. It has not been developed as yet, but it will, perhaps, in the near future.

9800 I have reported upon water supply properties to financial organizations, which reports were on projects in this state. Those properties were in Southern California. One at Hermosa Beach, which was a municipal supply for that town, and the other at Yucaipe Valley. The works at Hermosa Beach had been constructed at that time, and my report was upon the value of the property with reference to a bond issue. The property was owned by a private company. It was a pumping proposition, and in reporting the matter, I included the value of the land on which the pumping plant was situated. That is, the actual pumping house site, and the physical property at the pumping plant was included. I did not include any value other than this. I also reported on the Yucaipe No. 1, and also affiliated with it the Redlands & Yucaipe Water Co. That was an extensive plant, and I made a report on it for a bond issue.

I have made recent studies of the proposed hydro-electric system for the City of Los Angeles in Inyo County independently of other engineers. It involves 5 or 6 hydro-electric plants, and a very large power development on a natural stream in Owens Valley. One of those reports has been submitted to Mr. Scattergood, because he is

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the Chief Engineer of that department of the Los Angeles Public Works. He desired a general study of the possibilities of the system with respect to the water supply and the power output from the hydraulic end; it was with that in view that the study was made. The responsibility, so far as ordering construction work, or any work of that sort, rests with Mr. Scattergood. When I made these studies, the stage had advanced beyond the preliminary. I made the preliminary studies in 1912 and 1913; construction work now is in progress. These studies were to be used immediately for guidance in connection with the construction work in progress. The results of these studies were to be used as the basis of preparation of plans; as a matter of fact, after the perusal of the studies and the conclusions I had drawn therefrom, the plans were actually changed by Mr. Scattergood. The preliminary studies were made by an assistant to Mr. Scattergood, in his office. I was not an assistant to him at that time. I was an assistant to him in the year 1911, and early in the spring of 1912, but I have not been since that time.

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There was a plan before I went out to make my studies; the preliminary plan had been made for the construction of a diversion tunnel, based on studies made in Mr. Scattergood's office, and the tunnel had actually been started. In order to assure himself of the situation, Mr. Scattergood asked me to make a thorough investigation and report on the whole matter of available water supplies, and the possibility of development, and all matters which it would be necessary to take into consideration in the laying out of the final plans with reference to such matters as tunnel capacity and tunnel grades. Upon the completion of my report, and the submission of it, the tunnel grade was changed in conformity with the conclusions of this report. The report contained a matter with reference to the available supply; it was possible to divert a tributary of the Owens River into the Owens River, adding to the main supply, which was the Owens River. The supply, which was ultimately intended to be used for the generation of power, was the Owens River, and what additional supply could be diverted into the Upper Owens River drainage area.

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The City of Los Angeles had gagings of Owens River through a number of years at that time. The investigation which I was to make was to bring together all the data which was available, and which bore upon the subject, and apply it directly to this specific matter. The matter of diversion for the Los Angeles Aqueduct is quite a different matter from the amount of water available for power development on the Upper Owens River Gorge. Mr. Mulholland's office had measurements on all the tributaries which entered Owens River, and that information included a showing of the amount of water that could be relied upon at the proposed point of diversion for power purposes when these various measurements were worked

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up, and put into shape for drawing conclusions, but with reference to this specific development, this involved a comprehensive knowledge of the conditions in the Owens Valley with regard to irrigation and local uses of water; as well as the stream measurements. It was a very complicated situation, upon which the amount of power that could be developed in the Owens River Gorge depended, and it was on this that the study was involved. It was just as vital to the water project of Los Angeles as it was to the power project, but it was an entirely different problem. The power project has been one which has been worked up recently, whereas, the water project is one which was initiated in 1904 or 1905.

In the year 1907, the time of the first bond issue for the water project, there were some three or four years of measurements available upon which the conclusions at that time were based; since then there have been the very dry years of 1912 and 1913, and measurements have been continued since that time on down to date, including these dry years, which changed the conditions somewhat with respect to power development. In 1911, as assistant engineer in Mr. Scattergood's department, I made extended field surveys for the power project, and completed those early in 1912; in the latter part of 1915, and early in 1916, I have been called in to make this study of the available water supply for power development in connection with the Owens River Gorge project. The information which Mr. Mulholland had obtained with reference to the stream flow of Owens River and its tributaries was at the service of Mr. Scattergood, and an assistant in his office had worked up those measurements as far as he was able, and the result of that study has been used as a basis for preliminary plans for a power project. The first measurements for the purpose of determining the stream of Owens River and its tributaries were made in 1903 by the United States Geological Survey and the Reclamation Service. At a later date the City of Los Angeles continued measurements, and then still later the United States Geological Survey took up the measurements, and the City supplemented them. The work which the City did was first carried on by Mr. George R. Shuey, and then later for a number of years was carried on under my direction, during which time my rating was Assistant Engineer.

In the commencement of the work I established headquarters at Independence, and organized a staff for the purpose of gathering different kinds of information; storm flow, rainfall, snowfall, fluctuations of ground water, and irrigation conditions. I had 4 or 5 men, and sometimes 8 or 9 men at work on different branches of the subject. One reason was because the territory was quite extensive, and it required a number of men to cover it, and another reason was that the information was varying in nature, and required a considerable organization to get it satisfactorily. It consisted of more than

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taking meter readings and the height of water in wells; there were the rainfall and snowfall measurements, the mapping of ground water conditions with reference to the surface, the irrigation as practiced in the valley there, and a great many other matters that are related. That work was initiated in 1908, and Los Angeles had, at that time, the right to make its diversion.

A great deal of the irrigation was done direct from the Owens River, and some from the streams flowing direct from the Sierras. The City of Los Angeles had acquired some of the properties of the owners who were taking water from the river for irrigation, but they were still acquiring them for several years after 1908. They had acquired a considerable area after my first visit to the valley. There was a considerable quantity of water being diverted from Owens River in the vicinity of Bishop and Big Pine, and directly north of Independence, for irrigation, at the date of my first visit there. Most of the area that is irrigated in the vicinity of Bishop derives its water from the Owens River. Prior to determining to construct the Hydro-Electric plant a great deal of that information was in hand, but it was not knit together with specific reference to the power development, and there was considerable study necessary to connect it with the power development.

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All of that water, providing it could be diverted, whether used for power or not, was to eventually find its way back into the Los Angeles Aqueduct to be used by the City of Los Angeles, but it was necessary to ascertain whether the use for power would unregulate the water to such an extent that regulation would have to be obtained to get it into the aqueduct. That was all involved in this investigation report which I recently made, and the propriety of it was ultimately to be determined between the power department and the water department.

In San Diego County I have done considerable work in engineering, and in Nevada, independent of other engineers. Taking San Diego County in connection with the Cuyamaca Water Co., I have been employed a number of times with their water supply problems and valuations, and also with the Sweetwater Water Co. The Cuyamaca have had several appearances before the Railroad Commission, and in connection with those appearances have made detailed studies of their water supply. The capacity of their flume, which is their main artery of diversion, is some thirty-second feet. I have seen it flowing to capacity once, in the spring of 1915. During February and March, 1915, the storm flow was large, and some of the roads were out for a short time possibly, but it was not unheard of. I do not recall hearing that the road to El Centro was washed out in half a dozen places during this storm. I have never seen it before or since, but during similar months it is quite possible that it has flowed to capacity. That company has some storage capacity.

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9811 The Cuyamaca Reservoir at the head of Boulder Creek, and the La Mesa Reservoir, on the lower part of the system. Compared with larger systems, they are small in capacity. If I recall correctly, what might be termed the safe yield of the system during the irrigation season is somewhere in the neighborhood of 300 miner's inches, and that is for a 9-months period, and there is also water delivered during the other three months.

9812 I appeared before the Railroad Commission as a witness on the amount of water produced by the system. I did not place any value upon it. I studied the matter of the value of the water rights of the company, but I did not place any value before the Commission. The report which I made to that company of the value of its water rights is reconcilable, in my opinion, with the value which I have placed upon the Spring Valley water rights here. I testified before the Railroad Commission as to the water yield of the system, and other matters, but I did not testify to the value of the system as a whole. I did not express an opinion as to the value of specific parts of the plant. The extent of the testimony which was submitted to the Commission was with reference to the water yield of the property, and the use of water under the system, and there was also other data presented of a comparative nature with another system there. As that data was used by another engineer, that did deal with value. It was used in the same hearing in which I was a witness, and that other engineer was W. S. Post, if I recall correctly. If I recall correctly, I reported on the value of the water rights of the Cuyamaca properties to the manager, Colonel Ed Fletcher, and to Counsel of the Company. I did not make any sort of a report in writing to the company on the value of its water rights. Mr. Fletcher asked me to make a study of the matter.

9814 I have never placed a valuation upon gravity flow rights in any case, aside from those involved in this inquiry, other than the water rights of the Cuyamaca Company. I have never bought or sold any water rights. In the connection with the purchasing of bonds for properties, I have been consulted, but not for direct purchases of a water right. The Yucaipe Water Co., No. 1, I was consulted with regards to their water rights in connection with the sale of bonds. Its water came from both wells, and streams and springs. I made a report to the Hermosa Water Co., with reference to water rights, and also with reference to rights of the Yucaipe Water Co. Referring to the Hermosa Co., the situation there was rather unique; wells on adjacent properties had not all proved successful. I certainly regarded the water rights as a valuable adjunct to the system in that case, but in reporting to the company I did not include in my total valuation an allowance for this value as a basis for a bond issue. I made a statement as to the difficulty of obtaining water in that district, but as a basis for valuation did not include more than

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the land at its going market value in that vicinity; that is, the pumping site at its market value in that vicinity, and the physical property. With reference to the other property of the Yucaipe Company, I went into the matter of the water rights of the company with reference to reliability of the supply, and the dependability and character of the rights; the value which I placed upon those rights was practically what the rights had cost, as near as could be obtained. In making that valuation, I did not go into the subject in great detail; my valuation there was based on the actual cost of the rights. If I had found that water in that locality was very scarce, and there was no more surface water to be had, it would depend entirely on the local conditions whether the actual cost incurred by the company in the acquisition of those surface rights would have been the limit of their value. That town is on the slope at the base of the San Bernardino Mountains above Redlands, and for this particular company, and the lands which it served, that water is the most available water. If that supply did not exist, I think it would probably be necessary to pump water for the use of that locality from some lower elevation. That town is over 10 miles, I think from the town of San Bernardino. The town itself has merely a store, hotel and post-office, and the community almost every 20 or 40-acre tract has a house on it. The area covered by the community is 2,000 or 3,000 acres at least. If I recall correctly the terms of that bond issue, it was of a nature to cover the individual land properties of the owners in that community, but I do not remember definitely.

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I think it was the physical property of the company that was to be bonded. It consisted of a series of water development, tunnels and wells, transmission pipe line, distribution pipe line, reservoirs and pumping plants, and tracts of land at the pumping plants and wells. If I remember correctly, the amount of the proposed bond issue was \$150,000, but I could not say definitely. The report was made in January, and I have not been in Southern California long enough since making the report to ascertain whether the bonds were actually sold. I made the report for investors. In the Hermosa Beach case I made the report for the investors. In the Yucaipe case I did not report that the water rights had a value over the original cost, the valuation which I placed upon them. Those are the only properties that I recall at the present time upon which I have reported upon the value of water rights. I made some study of the Sweetwater Water Co.'s rights, at San Diego, but not to report formally.

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The amount of the bond issue proposed to be floated upon the Hermosa Beach enterprise was \$73,000, I think. That was a municipal water supply. Those bonds were placed upon the market last fall, but I have not kept in touch with the people that are handling them to ascertain whether they had been sold or not to date. The

9819 report that I made on the Yucaipe project was for Perrin, Drake & Riley, of Los Angeles, a bond buyers company. The report on the other institution was made for the same people. My total experience in connection with employments, in determining the value of water rights, prior to my employment in this case, consists of whatever I did for the Cuyamaca Company on that subject, and what I did in the case of these two properties to which I have referred. As part of my professional studies and general knowledge, I have read on the matters a great deal, but this, of course, was not in direct connection with any specific employment. It was just to acquire ideas, and to be qualified in case the matter was presented to me.

9820 As a result of all my investigation on this subject, I have concluded that the most reliable method, and the best in every way for ascertaining the value of water rights of the Spring Valley Water Co. is to rely upon original cost. If the company had not paid anything for those water rights, but had acquired them by prescriptive use, that is a matter which would have to be considered with reference to every other condition. I have considered the situation as it is, and in every instance of this sort the conditions differ, and there are different methods that it may be possible to apply; without study of a specific problem, and all the attending circumstances, the best method, or the result, cannot be determined. In order to value water rights, a man must certainly give the subject thorough study from all points of view. I have found no rule or yardstick in this vicinity for the ascertainment of the value of a water right. I find the ordinary market value yardstick is missing in this vicinity. The only adequate yardstick which I find present is the original cost.

9821 The company paid \$1,900,000, but not for those rights alone; in the first place, the ordinary method of determining the value by ruling market price in the localities is missing; then by taking similar conditions, as nearly as they can be ascertained, and determining the market value of water rights under these nearest conditions in other localities, I find that the value thus determined is far less than the original cost. It would obviously be unfair to place a value upon the rights less than the original cost; furthermore, taking the market value as determined by other localities, by a comparison with the water rights used in orange culture alone, as was done by Mr. Anderson, the method, if carried out, as I see it correctly, namely, the determination of the gross value of the water rights in use, applied to the total water yield of the system, and then deducted by the cost of the structures and lands necessary to develop these rights, would result in a very small, if not zero value for the company's rights; this shows, in my opinion, by two methods of comparison with water rights values in other regions, and entirely unjust and unfair results, because it is certainly unreasonable to find a smaller

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zero value for water rights when it is obvious that water rights cost something.

Questioned by Master.

The increase in assessed valuation in the vicinity did not enter into the valuation of the original cost; that was in the reproduction valuation which I undertook to make. If the company has actually expended, roughly, \$1,900,000 in these water rights, I think they should appear in the cash books if they existed. I did not include in there a valuation on the basis of a cost unit for a prescriptive right to water that has not ever been purchased; the items that are included in this total of \$1,900,000 should appear on the cash book, the items there, with the exception of the ranch lands in the Livermore Valley, that is the Livermore Valley water rights which were otherwise obtained. There was a percentage of overhead there.

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CROSS EXAMINATION BY MR. McCUTCHEN.

I regard the \$1,900,000 as representing the value for rate fixing purposes of all of the water rights in use by the company in supplying San Francisco with water, not alone for the reason that according to my investigations they cost approximately \$1,900,000, but because there is no market value for water rights in this region which can be determined by a sale, and when we go over to other regions for determining market value, the result which we get is one which indicates a value less than the cost which would be obviously unfair. For that reason I adopt the original cost of the water rights as the best value for rate fixing purposes. I regard this as the value of the water rights, all the water rights which are in use by the company in supplying San Francisco, whether they were purchased or not by the \$1,900,000. This would cover, in my opinion, the value of the rights which are used in supplying the city.

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If the company had water rights three times as great in their ability to yield as those for which it paid the \$1,900,000, then I do not think that the \$1,900,000 would represent the value of all the water rights; in other words, it would not represent the value of anything that it did not buy. I do not recall any water rights that the company has which this \$1,900,000 did not buy.

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My reproduction value of the Pilarcitos rights was \$96,000.

The Master: He stated that to resort to reproduction value in a case like this would be unfair where the entire reproduction cost was less than what the actual cost was. Here is a case at Pilarcitos where the reproduction cost would be greater than the actual cost. The actual cost is \$34,100.

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Mr. Lee: I think I have not made any statement with reference to the reproduction cost being unfair; merely that it was speculative. Reproduction cost certainly involves a speculation and assumption, and is unreliable to that extent.

ONE HUNDRED AND THIRTY-FOURTH HEARING.

APRIL 11, 1916.

Witness: CHAS. H. LEE for Defendants.

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Mr. Lee: In connection with the question relative to whether the \$1,900,000 odd, which was my estimate of the amount of the original cost of the rights represents the value of the rights of the company, in one instance I answered that it did represent the value of the rights which were purchased, and in another that it represented the value of the rights in use. These two statements as I have made them are not in conflict. Take the Alameda Creek; on that stream the amount of what was known as the million purchase, which I have ascribed to water rights I studied over considerably. The information on this subject is somewhat cloudy. It was my final decision that this amount of some \$800,000 represented and included a certain strategic position, as it gave the company a certain strategic position on the stream by virtue of which the yield was enlarged in subsequent years to some extent over and above what could be considered as the amount required by the Vallejo Mills acquisition and the Washington & Murray Township stock. The riparian purchases on this stream complete the company's rights.

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The attempt to segregate this payment into an amount representing the rights acquired from the Vallejo Mills purchase, and an amount representing the rights acquired from the Washington & Murray Township purchase, I considered at one time, and after studying over the matter I found that the information was not sufficient, so that my final conclusion was that the purchase placed the company in a strategic position on the stream, gave it rights which enabled it to increase its yield as time went on, and protected it against other appropriators.

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Taking the San Mateo Creek next, on this stream rights acquired by purchase of the riparian rights, together with the land purchases above the site of the Crystal Springs Dam, gave the company complete control of that stream, with the exception of, as I recall it, the Easton and Mills properties on San Andres Creek; it is my understanding that rights had not been acquired for these properties, and that understanding is based on the reading of a statement in the testimony of Mr. Rodgers, the manager of the Easton property, to the effect that the Spring Valley Water Co. was negotiating with him relative to the purchase of these lands and water rights in the year 1910.

On Pilarcitos Creek riparian rights above the Spanish grant line, between there and the company's lands, were not specifically acquired, but purchase on that stream was rather indefinite as to location, from all the information I had available, and I considered that in including amounts, one amount is some \$20,000, and another one a small amount I think it was—at any rate, including amounts which were not

definitely ascribable to this stream, this would cover any small cost ascribable to these tracts; the tracts were all in the hill country in a narrow canyon in the upper stream. My original cost of \$1,900,000 I consider represented the value of the rights purchased as well as the value of the rights in use.

If it had not been for the strategic position which the Alameda purchase gave the company on Alameda Creek, such a sum as \$800,000, in my opinion, would not be justified as an allowance for the purchase of the Vallejo Mills and the Washington & Murray Township rights. It appeared to me that the price paid there was very much in excess of any value which was represented by these rights. The only element which I could ascribe the value as having embraced was the strategic position it gave the company on the stream.

CROSS EXAMINATION BY MR. MCCUTCHEN.

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That is, strategic with reference to the right to divert water from the stream, and the right to divert water from the stream is what I have had in mind when I have spoken of water rights. As far as I see the matter it was strategic with reference to water rights solely. It is a very difficult thing to put a value upon a strategic position. It is something I could not exactly state definitely with regard to. The sum paid for the water rights in Alameda County certainly includes the strategic position. The water rights of the company in Alameda County are certainly not worth more than the amounts which I have placed on them. I had in mind that the value of the water rights of the company was not greater than that total amount of \$1,900,000. I had it in mind that they were worth that sum for rate fixing purposes. I consider that in a valuation for rate fixing purposes the investment of the company should be protected, and that a value should be assigned which would not be less than the actual amount invested.

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If an entirely satisfactory method, as for instance, market value, ascertainable by sales in the locality of these rights had been available, it is possible that if such a method had shown a value greater than the original cost that that would have been used, although the conditions in each case govern; such a condition if found in this bay region might very reasonably be accompanied by many other different conditions with respect to the cost of acquiring this company's rights. In this gross figure of \$1,800,000 odd, I took into consideration all of the water rights owned by the company and used in connection with the supply of San Francisco. I might qualify the last answer by including also rights which the purchase of lands gave the company. That is the ownership of lands gives the company certain water rights as well as the actual purchase of water rights, or the acquisition of water rights separate from the land. The \$1,800,000, excluding the Pleasanton Well rights, represents the value of rights acquired by the company and used in connection with the supply of

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San Francisco other than those acquired through acquisition of lands. In the summary on page 37 of my report, the item entered for Pilarcitos is \$34,100. That expenditure acquired the right to divert the flow of the stream at Pilarcitos Dam and Stone Dam with respect to riparian parcels below, and the purchase of lands at and above these dam sites, say the drainage area, as against other appropriations on the stream. The parcels directly below Stone Dam and above the Spanish grant line, do not appear on the map as having been acquired by purchase, but reading over the original purchases, it appeared they were blanket purchases in some instances. I regarded the \$34,000 as covering such rights, and that in my grand total of \$1,900,000 I have included in one way and another any cost of these rights in that interval. I have not applied to the purchase of rights on Pilarcitos any portion of the moneys paid for rights on other streams, but I have applied a percentage to the grand total to cover any omissions in any instance of that sort. I have considered that the company may have acquired some rights by prescription on some of these streams. After a study of all the stream sources and other sources, I considered that there was no instance of that sort. The original records of what actually was purchased there are not clear, and I considered that certain of these blanket purchases may have covered rights which do not appear on the map as having been purchased, and that if those blanket purchases did not cover such rights, then that the value of such rights was included in the percentage which I have added to the grand total to cover omissions. That percentage was included for the purpose of covering omissions, and for the purpose of covering any overhead expenses which were not historically charged to operating expenses of the company, but that amount was small. Mr. Bailhache said that in practically all instances such charges were made directly to the operating expenses. In my report I did not intend that that 5% should be understood only as overhead.

If those expenses were charged to current operating expenditures, the amount would have been received in compensation through the current rates; if they were charged to capital expenditure, they would appear permanently as an amount upon which interest should have been earned. Taking cost as the value of the right, I think it would make a difference whether that 5% had been charged as overhead at the time or not, or whether it had gone into operating expenses. In this instance the use of cost as a value for rate fixing purposes is for the purpose of arriving at a fair value for the water rights, and one which will protect the investment of the company; any charges to current operating expenses would have been already reimbursed to the company. I added the 5% to the grand total in order to get an amount sufficient to cover any possible omission. With regard to the expenditures on Alameda Creek, I considered that there was no pos-

sibility of an omission, due to the large amount paid there, more than the study of the rights acquired would indicate they should have cost, so that the including of 5% on that large item, as well as all the others, many fold increased the total amount represented by 5%, and so fully in my judgment included any amount which might have been omitted, as well as the overhead not chargeable to operating expenses.

It is difficult to get at a definite amount as the value of the Pilarcitos right on account of the records not being clear and definite. I have included more on the Pilarcitos than the records definitely and clearly indicate. I have included certain elements which were apparently spent for blanket acquisitions. To get a definite figure on the rights there would be difficult. I consider that I have included ample for the cost and value of those rights on Pilarcitos.

The right on Pilarcitos alone, as of 1913, I consider of less value, taken on the basis of market value of similar water rights in other localities, than the actual amount which it would cost to reproduce that right on that stream. The value of the Pilarcitos right would be a different amount by different methods. If the value were to be ascertained as a net value separate from the structures and lands necessary to develop the right, using the market value method, namely, to consider market value of similar rights in other localities devoted to a use to which this right might be put if it were not in use by the company, I think the right would be worth practically nothing by that method. If the reproduction cost was estimated, it is some \$96,000 or \$94,000. By the method that I outlined, the Pilarcitos right would be practically worth nothing, because the local uses of water are not so extensive, nor is the demand so extensive on that stream locally that heavy expenditures for storage would be justified. Of course, it is not zero by any means, but I mean it is a nominal value.

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I think it was very good judgment for the water company to avail of that source, and I consider that the Pilarcitos source is a very desirable addition to the system, and one that is of great usefulness. The fact that if you were to resort to certain methods you would arrive at the conclusion that that was of no value, would demonstrate that that method did not reach a reasonable conclusion with respect to this property under consideration, and the use to which it was put, and therefore, I would discard the method in this instance, and I have discarded it. I would discard any method that would not give to the Pilarcitos rights a value commensurate with the cost to the Spring Valley Co. of acquiring those rights. If it were to be assumed that someone who owned those rights gave them to the Spring Valley Water Co., and that in the course of years it became necessary to determine their value, in such a case I would certainly consider all the elements involved, and would include some amount for the value of those rights; just how I would ascertain it I would not attempt to state offhand,

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without giving some consideration to the matter. If I had no data on costs, I would be no more at sea in determining what those rights were worth than anyone is at the present time in trying to use the market value theory in respect to the valuation of those rights; we have no sales in the immediate locality except actual purchases by this company, and with such a state of affairs, there is practically no other means of getting at a value. In case such rights were a gift to the company, one would be in a very difficult position, indeed, to determine what the value of those rights were; you would not even have the single purchase made by this company in the locality.

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The amounts which have been ascertained as the original cost of these rights on these two-streams would indicate rights more valuable on San Mateo Creek. It is difficult to compare them on the basis of the amounts originally paid for the right, for the reason that there are other purchases, for instance lands, which enter into the question. Of course the yield of San Andres and Crystal Springs together is greater than the yield of Pilarcitos, so that taken as a whole, they are hardly comparable. It is entirely a question of the relative expense of developing these rights. As far as the gross water rights value is concerned, the rights are fairly similar in value. The cost of developing these rights, however, differs, and that would result in a net water right value which would be different. I have not actually worked that out in detail so as to be able to state. As to whether the water rights appertaining to Pilarcitos are the same value as those appertaining to Crystal Springs or San Andres, I have not considered that in detail. I have not actually determined the relative expenses of the development of the two rights.

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I recognized that the expense on the Alameda was less than on the Peninsula per million gallons developed, but in a determination of the total value, this did not enter. I considered that in this way; in applying the market value method I first ascertained the gross water right value of these rights, and then deducted therefrom the cost of developing, and bringing the yield of these rights to the local consumer, in that way getting a local net market value for the Alameda right. Then I recognized that the cost necessary to develop the right on the Peninsula was far greater than on the Alameda Creek, and that the market for that water for general use in the localities for irrigation purposes was very small, indeed. I then recognized that in applying the net market value as determined on Alameda Creek, I was applying a value which represented something greater than the net market value in that locality could have been, based on this method, so in that way I took into consideration the expense involved.

I could not say, without a study of it, whether the yield from Pilarcitos per million gallons is worth as much as the yield per million gallons from San Andres, and the yield per million gallons from

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Crystal Springs. It involves a study of the matter that I have not given to it in detail. I am not prepared to say, from the investigation I have made of the subject that the yield per million gallons from Crystal Springs is worth more than the yield per million gallons from Pilareitos. I have not given the matter sufficient thought at this time to give any opinion in the matter. I have not arrived at any value per million gallons. I have merely made a division of the total amount by the quantity yield of the rights in order to show what it was. I have arrived at a determination of the value in toto, but not per unit. I have gone into the matter of market values in other localities, and have indicated that if a comparison is made on similar bases, the market value per million gallons is not some \$114,000, but may be very much less; in fact it may not be more than \$8,000 or \$10,000 per million gallons. I think that these various enlargements upon the subject have brought considerable to this discussion.

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Following out the market value theory, the Pilareitos rights would have been of small, or nominal value, but they would be valuable as used by the company supplying San Francisco. My conclusions having lead me to the conclusion that those waters were necessary to San Francisco, and that because they could only be used in the neighborhood where they were purchased for watering stock, and for that purpose only had a certain value, I would absolutely not say by the same token that they only had that value for the purposes of supplying San Francisco. That is the very reason that I abandoned that method, and adopted the original cost, because it is obvious that to this company these rights have more value than they had in supplying stock on the stream. We have no measure to determine their market value in this locality. If they were acquired for much less than their value for watering stock, under such a condition I would probably consider them in the light of this higher value which might obtain locally, but other conditions and circumstances would have to be considered. Admitting that the waters are worth more for use in San Francisco than for any other place, or any other purpose, and that they had actually cost less than they were worth for the purpose of watering stock, you would have to take into consideration to determine whether they were actually worth only their cost, or only the amount of their worth for watering stock, the cost of developing the yield of these rights for use in San Francisco. I know that the cost of developing that water was greater than the local uses on that stream would warrant, and by local uses I mean stock, or irrigation of the lower land on the stream.

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I took the cost of development of this system into consideration in arriving at my figures on value to this extent, that by investigation of the market value theory, and going into other localities to determine market value, I found that the market value for this water in use, corresponding with similar uses in other localities, was a small amount;

on Alameda Creek it was some \$15,000 a million gallons a day, and would not be, in my opinion, more on Pilareitos Creek, and then deducting from this amount thus obtained the cost of any of the Peninsula rights, negligible, zero, and less than zero quantities would be reached. Even taking the value of some \$114,000 a million gallons a day, which was adopted by Mr. Herrmann and Mr. Anderson, and deducting the cost of development of the right on the Peninsula, the same result practically—zero, or less than zero—would be reached, so that I took the cost of developing these rights into consideration to that extent. In both instances I recognized that these values are not zero or less than zero, but that they were worth something, because they had cost something. I regard the original cost of the right as being something which should not be disregarded. As I see it, it had much to do with the intrinsic value of the right. The intrinsic value of the right based on its market value in a locality is much less than the value of those rights to the company.

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I would have taken cost if I had been called upon one year after the acquisition of the right to determine value. They are worth that sum to this company 5% plus cost the day after they were acquired in the use to which they put the rights, provided there was no additional expense necessary to make the rights available. They are worth that to this company in connection with a valuation for rate fixing purposes. They are not worth it to anyone else as determined by the general run of market value in the community if this water was available for other uses. That is true absolutely with regard to irrigation.

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I do not think it is sound or scientific in this locality to consider the availability of those waters for irrigation in determining their value, and that is the very reason that I adopted the original cost as the basis for value of the company's water rights; irrigation on the Peninsula on the east side is not necessary, and on the west it is used for one crop only, and that a very limited demand. On Alameda Creek the use of water for irrigation is not general, and the value of these waters for irrigation is very small, indeed, in this locality. I won't say that it is almost negligible as compared with its value for the purpose for which it is used. The conclusions I had in my reports show that relation of its value in irrigation to its value for domestic purposes, but its value for domestic purposes in one instance for the Spring Valley Water Co. would be corresponding with values in other instances if some other company were using the same waters for supplying San Francisco or Oakland, we will say.

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If this water on the east side of the bay should be purchased by Oakland, I do not think its value would be limited to its value for irrigation purposes. I think the same situation would arise there as has risen in connection with the valuation for the Spring Valley Water Co. The use of the water in irrigation is limited there, and

its market value would be impossible to determine, because there are no local sales. It would be necessary in making a valuation of rights devoted to such use to use the same methods that I used, namely, the original cost. If we start today, there is a growing demand for the water on the east side of the bay. I have understood that the supply in 1913 was not fully adequate, and in fact, there was danger of a shortage, and I take it from that there was need there for more water. If it had been possible for the Spring Valley Water Co. to sell to the City of Oakland, and I had been called upon for advice as to the price which it should charge per million gallons, that would be entirely a different problem than valuation for rate-fixing purposes, and I have not given consideration to that. I am determining the value of these rights to the company in connection with rate-fixing proceedings. Any such sale as that would be subject to review by the constituted authorities, the Railroad Commission, and my experience has been that the value, as determined by such procedure, is a value which tends toward original cost. Mr. Eshleman, in the Glendale case, adopted the market value theory or method; in that vicinity market value apparently was capable of adoption and use. If this were a sale to the City of Oakland, and I was called upon to fix the value of these rights for purposes of a sale, that is a matter that I have not given detailed consideration, but generally speaking, in view of the fact that the original cost exceeds the value determined by the general market value theory, I do not see justification for advising on my part a value in sale greater than original cost.

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I found the original cost in this case to be many times greater than the value indicated in my efforts to ascertain market value. If I was called upon to place a value upon these rights in connection with a sale to the City of Oakland, and the value, as determined by cost, had been \$8,000 per million gallons, and as ascertained by the market value theory had been \$8,000 per million gallons, the market value on the original cost would be the value that I would consider from all angles should be placed upon the water rights. The value of \$8,000 per million gallons was the value in use for the crops which were raised on the Cone, and which are irrigated in some instances—the alfalfa and deciduous fruits. As to whether I would advise the company that if it got \$8,000 per million gallons for its property considering the need of Oakland for that water that it was getting all that it was worth. There are many elements to consider in there, and I have not given the subject detailed thought, and I do not know that I could say definitely, without further study, whether it was getting all that it was worth or not.

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I have not given the case of sale consideration. I have considered in this matter the rate fixing, and in case of sale there are many other factors that come in that should be given consideration.

- 9852 If it were for purposes of a sale, the opinion which I have expressed heretofore on the value of these water rights might or might not obtain, and I have not given the matter sufficient consideration at this time to state whether it would or would not. Of course, the value of the property in a sale depends upon the rates, and there is a relation between the two, but I have not considered the matter in detail at the present time. I would not tell the Spring Valley Co. in this matter of sale that has been instanced that it would have to wait until the rates were fixed until I could tell what the water rights were worth. The matter would have to be determined from the data and the conditions at hand. Notwithstanding my study and investigation given to this subject since May, 1915, in the case of a sale I would wish to consider the matter of the value of these water rights specifically from that standpoint. I have considered it in this particular connection, but have not considered in the broader phases among which might be valuation for purposes of sale. My answer stating the value of this property might or might not be a statement of the value of this property for all purposes. I have not given consideration to all other purposes. I should say my statement on direct was as follows: That after a consideration of the subject, that the original cost of the water rights of the Spring Valley Water Co. represents the fairest basis for estimating the value for rate-fixing purposes, and that is my conclusion; that same value might be the best one to use in connection with a sale after I gave the matter consideration, or there might be other elements come in which would change that. I have not given consideration to that matter. I did not intend to express an opinion as to the value of those rights for all purposes. I had in mind a value for this specific purpose. If I had had in mind a value for all purposes, I don't know that my answer would have been materially different. It might, or it might not be different. If I had been determining the value of the property for purposes of a sale, my conclusion might have differed from the one which I gave here; I have not considered the matter as applied to a sale. I could not give the maximum percentage of difference, as I have not given the subject consideration at all. Under the existing conditions as of today,—the last two or three years—I do not believe that it is possible that these rights might realize 50% more than the value I have put upon them. What I had in mind was that in the event of any such sale the price at which the sale was made would be determined by the Railroad Commission, and the tendency of this authority, in my observation, has not been to exceed the original cost.
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9856 If there were no rate-fixing body, I would not feel that I was without a yardstick to determine the value of this property for purposes of sale. The highest use to which water can be put depends entirely on what is considered. If the absolute needs are considered,

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of course commercial use in irrigation is not the highest use; if absolute needs of the community are considered, then the highest use becomes the use in domestic purposes, but that to my mind does not involve any question of the value of the rights from such use; that has to be specified in connection with this idea of highest use. I start with the assumption that this water derivable from these rights of the Spring Valley Water Co. is available for domestic use.

Assuming that it is available for that use, and that there is no Railroad Commission, and that the property has to be sold, I see no reason for concluding that the value of these rights in the event of such a sale, under the assumptions, might be 50% greater than the value I have actually determined, namely, the original cost. There is an entire absence of sales for this purpose to determine market value, and in such absence the yardstick for its determination, as ordinarily used, is missing, and the only yardstick that remains is what the rights originally were purchased for, because by the company's actually paying for these rights in a measure market value was established. We have no general recognized market value in the community, based on a number of sales; we have only the original purchase by this company.

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I have not given the subject detailed consideration, and do not feel in a position to answer as to what my advice would be to the man who wanted to sell, or the man who wanted to buy, as to the value of the property to be sold by the one, and purchased by the other. I do not believe that it would be radically different from the result I have announced here. The considerations I have just given are the yardsticks that guide me to that answer; that there are no sales of water rights in the locality to base a determination of value on, other than the original purchase of these rights by the company, and that these would, in a measure, tend in forming an opinion, to limit the possible height to which soaring might be attained in an estimation of value. It certainly could not go below it. Without any subsequent sales, it would be impossible to determine whether market value had risen or fallen since such a purchase. The transaction in which the purchase of the property was concluded, if an evidence of market value at all, would be evident of the market value at the date of that purchase, but I also say that in view of the conditions here, without any records of any other sales available, there are no means of ascertaining whether it is greater or less than the original purchase cost.

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For the purposes of my valuation, I have assumed that the company owns all the rights to water on Pilarcitos Creek which are in use in supplying San Francisco with water; that is the effect of the value which I have assigned. As to what that diversion amounts to in million gallons daily, I have not gone into the detail of. I examined Mr. Anderson's report, and other reports in the "Future

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“water supply of San Francisco”, and I think I took the matter up with Mr. Sharon with reference to whether the “Exhibit 12-U” included the water from Pilarcitos, and he said it did, so I knew that the amount of water which I had considered and stated as the yields of these rights were inclusive of the Pilarcitos water. The information in regard to the acquisition by purchase of water rights on Pilarcitos is contained in my memorandum relative to original cost.

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Mr. Metcalf: The supply from Pilarcitos was in “12-H”, in the column of mean run-off, million gallons daily, 3.2 million; San Andres was 6.3; Crystal Springs was 10.1; making a total of 19.6. Mr. Lee, I think, has assumed 19 million gallons.

CROSS EXAMINATION BY MR. MCCUTCHEN.

Mr. Lee: I examined all of the information which I could obtain to determine the rights of the various grantors. Of those that I have included here, the rights are merely riparian rights separate from the land, and did not include the lands. It made no separate determination of any percentage of the flow of the stream to which such rights might appertain. With respect to the amount diverted by the Spanishtown Mill, I found no information relative to the quantity. To the best of my knowledge, Spanishtown Mill used the water for the purpose of developing power for grinding flour, or other meals. Judging from the position of the mill, it must have diverted the water above the junction of the two forks at Half Moon Bay. I have no information as to how much water it used. As I recall it, those owners on that stream, listed on my Table 1, are the ones which are indicated on the Spring Valley Atlas sheets as being the only ones riparian to the stream below the Spanish grant which were acquired. I think that corresponds with the listed purchases, as shown in the inventory, too. These owners were all below the point of diversion of the Spring Valley Water Co. I think that some of them were above the point at which the Spanishtown Mill diverted, and some below.

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In arriving at my conclusion I determined that the right to take all of the water that the company was taking at the time these ordinances were passed, existed either by right of purchases made on the stream, of which we have record, or by the application of the 5% to the whole sum, any omission which may have occurred because of the fact that the rights were not listed as purchased, would have been covered. The specific point as to whether the right to divert all of that water at the time these ordinances were proposed existed by right of purchase is very difficult to determine from the records as I have had them; while I am not able to say specifically whether all of the rights in use by the company as of 1913 were purchased, yet I believe fully that the value which I have arrived at as original cost includes any value which may appertain to the rights which possibly

may have been acquired on the creek, but not by purchase. I am satisfied that my addition of 5% covers the purchase price of rights to the extent to which the water could be put to use in that section of the stream which is a canyon, and there are practically no riparian uses to which the water could be put other than for domestic or stock purposes. The habit and custom in this region have been established of acquiring rights by purchase, so that that, and other reasons, would lead to the conclusion that some compensation or value inhered in such rights. My understanding of the land between the Spanish grant, and the land owned by the company at that time was that it was government land which had not yet been patented, and my understanding of such a situation is that the land when patented is patented by private individuals, with the understanding that the land is subject to any diversions from the stream made prior to the patenting, or prior to the date of acquiring title. It was my understanding, to a certain extent, that the company acquired the right to some of that flow by purchase, and to some of it by appropriation, in-as-much as the land was government land. I felt that the amount which I included fully covered the cost of acquiring riparian rights on private land, and the company had acquired them as I had assumed it acquired them if they were private. I felt that under any condition which actually existed I had fully provided for the probable expenditure there.

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I had in mind as a possibility that part of the rights to divert water from Pilarcitos were acquired by an appropriation of that water under the laws of the United States, but I was not informed in detail with reference to each specific subdivision of the public survey between the Spanish grant and the point of diversion of the company. The amount that was paid to certain parties for the right to divert water from Pilarcitos I have set forth, and I don't think there was a considerable additional acquirement necessary. There may have been some additional rights. I was not fully informed on the detail of that. If the land between the Spanish grant line and the land owned by the company at Stone Dam was government land at the time the diversion was made first, as I understand it no additional right would be necessary to acquire, other than the physical fact of diversion from the stream and use. If there were private lands in this section of the stream at that time, it would undoubtedly be necessary for the company to acquire the right to divert from the stream as against those lands. The records are not in such shape that I have been able to ascertain whether the company did acquire them. It certainly could have acquired that in one of two ways.

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I may have given some allowance for the value of that water right, assuming that there were no private parcels, in an item of some \$20,000 which I have included, and which I have not been able to locate specifically on any tract of land. For all the information I

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9866 had, that amount was for water rights on Pilarcitos Creek. That item occurs in the Municipal Reports for 1900-01, under the appendix "Water Rates", page 31, and that is the only information I have on the subject.

The lands above the Spanish grant line, on Pilarcitos Creek, were in the public domain, and according to my understanding, riparian tracts would be limited to some subdivision less than a section of land, probably a quarter of a section; the area of such lands between the Spanish grant and the Stone Dam would be very considerably less than the area represented by those acquisitions listed in my Table 1; area and lineal footage along the stream, although about the same, is in a very different character of land. It is in narrow canyon land, and some of it in mountainous regions.

9867 The parcel 607 includes the Spanish grant on the south side of the creek from what I have spoken of as the east line of the Spanish grants to the ocean. As I understand the acquisition, that was an acquisition of riparian rights separate from the land. On the north side of the creek, parcel 614 covers the riparian land from the ocean up to parcel 610; this is also an acquisition of riparian rights separate from the land. 610 completes the riparian land on the north side of the stream up to the Spanish grant line on the north side of the stream. These three parcels complete, as shown on the Spring Valley Atlas sheet, are all riparian acquisitions. There are lands on this atlas covered by the public survey extending through Section 22 of Township 5 South, Range 5 West, and cornering on Section 15, and running through Sections 14 and 11, cornering through Section 10, and terminating in Section 3, that are riparian to that stream between the point of diversion and the ocean. Following the meanderings of the stream, the length between the point of diversion and the first of these riparian rights acquired is greater than the length from the last named line to the ocean; that is, taking the distance along the stream, it is slightly greater above the Grant line to Stone Dam than from the Grant line to the ocean.

9868 On Table 1, page 4, of my original cost estimate, there is listed not only those parcels which I have described as being riparian to the stream, but a parcel 603 which I have been unable to locate. There is also listed on page 25 of my report an item of some \$20,000, and these two items are both in addition to the riparian parcels as shown acquired by the company; for neither of those do I find any statement as to what portion of the stream they apply. I judge that that \$20,000 item did not include the individual items aggregating \$14,100, from the fact that the sum was paid to different individuals. For instance, the \$20,000 item was paid to H. A. Hilm in 1864, whereas the other items were paid to other individuals, some of them in previous years, and some subsequently. I do not know whether Hilm was paid anything for the right to divert water so far as the

frontage of lands on the portion of the stream which meanders through the government domain is concerned. As I understand the situation, where land is in the government domain, and diversion is made, the transfer of such lands to private title by patent, the patentee's riparian rights to the stream are subject to the diversion as made while the land was in the title of the government. I assumed that that is the way the company acquired the right to make the diversion as against that land, but in order to cover the situation, should it appear that it had not, I put in these items which I have mentioned, these other two items, and I also felt that the 5% for omissions would cover the cost of such rights if they were not. The probabilities were thought that the lands were in the ownership of the government at the time the diversion was made. I do not mean that the aggregate of those purchases that we mentioned a moment ago, plus 5% of that aggregate would entirely represent the value of all the Pilarcitos rights. The 5% covers all items of expenditure by the company, and on a number of items it results in a sum larger than is reasonable to assume the overhead or omissions with respect to that particular source would seem reasonable, so there was a sum which might be considered as available for covering items, considering the system as a whole, which might be omitted.

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The yield of the right in Alameda County, and on Pilarcitos, is used for supplying the same community. My idea would be, in ascertaining the original cost, as I have done in this case, to get an amount which certainly covered all possible expenditures; the amount which by no means has the question attached to it that it was possibly below what was actually paid, or what might have been paid, or what the value by this method might be considered, in the absence of records, for instance, of expenditure. It is my judgment that 5% added to the aggregate value of the Pilarcitos and the Alameda rights would overcome any injustice that might possibly arise by relying on the cost of Pilarcitos alone, as shown by the Pilarcitos record of purchases. It is my judgment that that covers any element of uncertainty. In consideration of the character of the land on the Pilarcitos, and the very sparse settlement at the time, and the value of the riparian rights up in the canyon, I consider that the addition of 5% covered a fair cost of the additional one-half of those rights at the time the purchases were made, and very much more, too, assuming that it was within the possibilities that the expenditure of that \$34,100 did not actually purchase one-half of the rights on Pilarcitos. The \$14,100 was not up in the canyon, it was low down on the stream where the land was open for settlement. The utility to those men up in the mountains, if that land was in private ownership, would not have been as great as to the owners of land down on the lower part of the stream near the ocean.

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9873 There is nothing included on this table to represent the cost of the water right as against Parcel No. 2 on the Pilarcitos Reservoir Watershed. That parcel is on the upper reaches of the stream, and the topography of that region is rough, and the utility of the right to divert with respect to such lands would be very small.

9875 Parcel 228, on Map 12, of Plaintiff's Exhibit 8, the Romaguirre is an instance of a parcel of land which was riparian to the stream on Alameda Creek, and for which no item of original cost is included in my total of original cost of water rights, but which is included by the City in the land appraisal. My total of \$1,800,000, as applied to Alameda and the Peninsula, together with the element of value ascribable to water rights included in the valuation of such parcels as those I have just indicated, would aggregate the total value of the water rights under consideration. I could not state offhand, without looking over the different stream sources to determine to what extent I have not included the value of rights on parcels which are included as lands in fee, how much would have to be added to my figure of \$1,800,000 to represent the total value of the water rights.

9876 There are not many such parcels, but offhand I don't remember the number. I don't think that it would be necessary, considering the Peninsula and total estimated cost as a whole, to add anything to my valuation of water rights on the Peninsula in order to get the total value of the Peninsula water rights. I consider it is only necessary to take into consideration riparian lands below the Crystal Springs Dam. The company has acquired, and owns the land in fee above those points. In consideration of the fact that the value of these lands is included in the grand total of the appraised value of the property, I consider that is all that is necessary to be known to enable a gentleman of my profession to determine the value of the water rights on that stream above the big dam; that is with respect to the riparian rights.

9877 Before the concrete dam was built, a dam had been built in Crystal Springs Valley, known as the Upper Crystal Springs Dam, the building of which created a reservoir in which water was impounded. It is my recollection that that dam was built more than 5 years before the concrete dam was built. From my investigation

9878 of the cost records, there were no payments for the privilege of diversion from that branch of the stream at that reservoir site. That is, no right acquired separate from the land by such entries. I have not investigated, however, the purchase of lands, the dates when the lands were acquired below that dam-site, and above the Crystal Springs Dam-site. I investigated all records of acquisitions of riparian rights by the company that I could find, and felt thoroughly

9879 satisfied that such acquisitions were not made on San Mateo Creek prior to the construction of the Crystal Springs Dam, and that the acquisition at, or about that time, in connection with the Crystal

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Springs Dam covered all such rights. With respect to the Upper Crystal Springs Reservoir, I do not recall now the exact date on which diversions were made there, but it seems to me that I found no record of diversion there prior to some time in the eighties. What I mean to say was, sometime about the time the purchases of the lower riparian rights were made on the stream below Crystal Springs.

The value of the water rights is the costs which the company incurred in acquiring them. In order to have arrived at that conclusion, I gave consideration to the possibility to certain rights having been acquired, for which there were no recorded purchases made, but I felt that any rights of that character did not involve a sufficient amount not to be covered by the grand total which I have reached as the original cost. I, at the present moment, do not recall the detail of my investigations as to the date of diversion from Upper Crystal Springs, but I fully feel that the amount of \$1,900,000 includes any such rights which may have been acquired, because it includes what might have been the reasonable cost of such rights. I know that it includes what might have been the reasonable cost, for the reason that the distance along the stream below the Upper Crystal Springs Dam, and the Crystal Springs Dam, is comparatively short, and judging by the amount which was paid per front foot on the lower part of the stream. All riparian rights below the big dam are listed by me. I have taken the list of riparian rights acquired from the inventory, and found that they check up with the atlas sheets of the company, and have also included the amount for the lands which the company owns in fee, but which, as I understand it, the City has not included in its valuation of lands which lie between the dam and the parcels for which riparian rights have been acquired separate from the lands.

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Mr. Searls: I think that Mr. Lee has omitted that Polhemus Parcel, due to the fact that a part of it was included as in use. He probably did not check the acreage with the amount that was out of use; if that is the case, a value should be added for the riparian right on that part out of use.

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Mr. Lee: If in my notes no allowance has been made for rights against that land, there certainly ought to have been, because I had no intention of omitting a parcel which was riparian to the stream below the site of the dam. The company had the right of storage and diversion with respect to the flow of the stream as against these lands below Lower Crystal Springs Dam. I think I considered what the flow was in my report separate from the other sources of the company, and I considered the summer flow of the stream to about the extent of about a million or a million and a quarter gallons a day. As I understand it, with storage, the company is actually diverting between 9 and 10 million gallons a day.

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If the company had held back enough water to fill the Upper Crystal Springs Reservoir for at least 10 years prior to the construction of the Lower Crystal Springs Dam, the question of whether it had acquired by the date of the building of the lower dam the right as against the land below the upper dam to hold that water back, would depend entirely upon the legal situation with respect to flood water, and whether the flood flow of the stream constitutes a portion of the riparian owners' share of the stream. I consider that the company has the right to divert the waters of San Mateo Creek. With regard to the diversion at Crystal Springs Dam, I consider that the company acquired the right to divert the normal flow of the stream by the acquisition of their riparian rights from the land owners below on the stream, and the flood flow by the ownership of the lands above the dam-site and the reservoir lands. I did not allow anything for any rights that did exist prior to the building of the Lower Crystal Springs Dam, specifically; I found no reference to any amounts paid by the company for such rights, and in view of the situation with regard to the flood waters, I considered that the value of such rights would be covered by the cost of lands and structures connected with the storage of the water. I am speaking now with respect to the water that is stored in the Upper Crystal Springs, the flood water; on Alameda Creek it is a normal summer flow. I have found that the company has the right to divert a fixed quantity of water, taking one year with another, and I have included in that the winter flow, or the storm waters. The right to divert storm water, considered in its gross value, is of value as a water right, but the heavy expenditures necessary for structures and lands wipe out to a very large extent such value when a consideration of water rights value alone is had.

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In arriving at the value of the right to divert this water I do not think I have drawn any distinction between the storm waters, so to speak, and the normal flow, so to speak, as such; but it is hard to state flatly on that subject. I do not think I have made such a distinction. In the valuation as I have made it, I do not think I have made any such segregation between summer flow of water and flood flow of water. It would be illogical and indefensible to attempt anything of that kind as far as the effort on my part from the standpoint of an engineer is concerned, and by the method I have used. If the market value method was applied, the segregation would be a desirable one to make in view of the fact that the summer flow water does not require storage structures to develop it, whereas the flood waters do. The summer flow in the Peninsula is very small, and it is quite necessary to impound the winter or flood flow in order to derive a yield from that stream.

The water which was held back, if at all, in Upper Crystal Springs Dam, was largely flood water in San Mateo Creek, and to

that extent would involve a legal question as to the claim of the riparian owner upon it; with respect to the summer flow of a stream from that point, from the Upper Crystal Springs Dam-site, there is a very small flow at that point, and I should think practically negligible; as I understand it, the company owned the land within the Upper Crystal Springs Reservoir site at the time of the construction of the reservoir, and any value which there might be ascribable with reference to the right to store at that point, I considered as embraced within the value of the land acquired. I did draw a distinction between flood water and normal flow in fixing the value of these water rights in instances where storage was undertaken, and the lands at the storage site or above were owned by the company. I considered in those instances that any value attaching to such rights was included in the value of lands and storage structures of the lands above, in the watershed, and of the reservoir site and the storage structure, plus the cost of riparian rights below that point. I was informed that in the case of flood waters a different situation with respect to the lower riparian lands existed than in the case of the normal summer flow waters. That was a statement by Mr. Searls. I am not a lawyer, and I took the lawyer's interpretation in that case in view of the fact that it was largely a legal question.

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In my own mind I felt that the value of the right to hold back the storage water, the net value, was very much less than the right to divert the summer flow of the stream, if any, by reason of the large expenditure necessary to develop that right, and make the yield of it available. I have assumed at the outset that storage was necessary in order to avail of water on the Peninsula. If conditions came about by which the amount of water which you could impound would be enormous, as compared with the amount which you could impound from natural flow, I did not say that the flood waters, or the right to hold back the flood water would, for that reason, be of less value than the right to hold back the summer flow; for the reason that the expenditures necessary to develop and make available the yield of the flood flow would be very large as compared with the expenditures necessary to develop the summer flow. I am speaking of per million gallons daily.

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Looking at it from the standpoint of a water company, the flood flow is of much more value in the gross water rights value than the normal flow, and of the gross value per million gallons, but when the cost of development of flood water per million gallons is deducted from the gross value per million gallons, then a net value very much less is arrived at for the right to develop flood waters than the normal flow waters. I am considering the case as it exists on the Peninsula, where storage is expensive; in fact, any over-years' storage in this part of the state is expensive. I consider as a unit water right value, exclusive of every other element, structures and lands,

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and everything else, that the value to hold back the flood flow is less valuable than the normal; I am not considering the gross value including lands and structures, but the net value.

9891 One engaged in the business of selling water, and of impounding water on the Peninsula, desires volume in order to enable him to carry on his business successfully, and it is flood flow that will give you volume. Considering the San Mateo Creek for practical purposes, you could almost afford to leave the summer flow go by if you could get the flood flow regularly. The net value of that water in use, of the yield of those rights in use, in my opinion is less where storage is necessary than in the case of natural summer flow water, both considered per million gallons per day. You could avail of the summer flow without storage, and the summer flow, as I determined it, is somewhere within the neighborhood of a million or a quarter million gallons a day.

9892 That could be availed of with very little storage at the diversion point for use in San Francisco. I would not advise anybody to engage in the business of conveying that water to San Francisco unless he had storage so that he could impound much more. It is more valuable than the right to store the flood flow, because there are large expenditures necessary for structures and lands if storage of the winter flow is undertaken, and although the gross value of the right to store the winter flow is greater than the right to store the summer flow, yet when the cost of these structures and lands is deducted, the net is very much less. The net value of the yield of the right to take the normal flow is more valuable than the right to take flood flow per million gallons. That is the net value of the right to take summer flow is more valuable than the net value of the right to take the flood flow. By net value, I mean after the cost of structures and lands has been deducted. You could not construct a system for supplying San Francisco for the conveyance of only that summer flow commercially, as the game would not be worth the candle for supplying San Francisco. Without that flood flow the waters of that stream would not be available for practical purposes for use in San Francisco, and without storage you could not avail of the winter flow.

9893 It is possible when you avail of the winter flow by storage that you can, by the same works, store the summer flow, but as a practical matter I should suppose that the summer flow would be passed right on through to the transmission system, and be used. It would not be any drawback to let it run into a reservoir first, and then run out.

In stating that the net value of the summer flow would be greater than the net value of the storm flow, this is what I have in view: The value of the yield per million gallons of a right is worth a sum of money; the value to the owner of such a right that he could put that right in use is worth a certain sum, and that, I should say is a gross value, and is irrespective of whether the water is summer flow or

winter flow. It is just its yield, and if a company proposing to go into that business of supplying water to a community has the choice of a continued flow as distinguished from a flow which must be stored before it can be made available as a continuous flow, there is no question but what the stream which has a continued flow would be chosen by that company. The value of a continued yield in use is the same in the two instances, the gross value, but in one instance the company would have to undertake large expenditures for lands and structures where in the other instance it would not.

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ONE HUNDRED AND THIRTY-FIFTH HEARING.
APRIL 12, 1916.

(Certain corrections noted in the transcript.)

9895-9896

Witness: CHAS. H. LEE for Defendants.

DIRECT EXAMINATION BY MR. SEARLS.

I won't say that the value of water for irrigation purposes on Alameda Creek is almost negligible as compared with its value for the purpose for which it is used; the conclusions I had in my reports show the relation of its value in irrigation to its value for domestic purposes, but its value for domestic purposes, in the instance of the Spring Valley Water Co., would correspond with the value in other instances if some other company were using the same waters for supplying San Francisco or Oakland.

CROSS EXAMINATION BY MR. MCCUTCHEN.

What I had in mind in that statement where I say its value for domestic purposes would correspond with values in other instances was that the original cost would of necessity be used by me for the same reason which I used it in this case if the water was being supplied to Oakland; the same reason would obtain that obtained in those instances in considering the supply of water by the Spring Valley Water Co. to San Francisco. The ratio between its value for irrigation purposes as compared with its value for the purpose for which it is used might be well expressed by the ratio of my value as determined by the market value method to the value which I actually adopted, namely, the original cost. By the market value method I fix the value as something like \$8,000 per million gallons. I have no value per million gallons by the cost method. The total value of all the rights is what I arrived at, but no value per million gallons; the ratio of the

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total in the case where I used the market value method to the total in the original cost method would give this ratio I speak of. Under the market value method, in order to get at my gross value after having determined the value per million gallons, I determined the number of million gallons per day that the property would produce, but I did not do that under the method of original cost.

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I say that the ratio between the value of the water for irrigation, and its value for domestic purposes, is the ratio between the valuation determined by me by the market value method, and the valuation determined by me by the cost method, for the reason that the total yield of the rights is the same in either event; no matter which method is used, the total yield of the rights would be the same. On Alameda Creek these water rights for irrigation I value at \$8,000 per million gallons, but I have not, and I cannot by the method I have followed state their value per million gallons for domestic purposes. I cannot find a method by which I can state it; that is the reason that the original cost method was adopted, because there was no method by which the value of these rights per million gallons could be adequately determined by this use. There was a method by which the total value could be determined, but not the value per million gallons. If the total values I have ascertained of original cost be divided by the yield of the water rights of the company, that will result in an amount of practically \$54,000 per million gallons a day, but this I do not regard as being anything more than a computation. I regard it as a value, which after considering all the elements in the matter, represents my opinion of the value of these rights in this case. I said that I did not regard that as value per million gallons, but I did not say that I did not regard it as the value of the sum total of the rights of the company in use.

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Taking the statement in my report: "I have estimated this value "to be \$1,932,998.82 up to December, 1913. If this amount be divided by the yield of the water rights, 35.8 million gallons, as a result "of practically \$54,000 per million gallons is obtained." The point is that if the original cost, as I had ascertained it, or if the quantity of water had differed, then this amount per million gallons would have differed. It does not represent the general value in the community based on the use of the water per million gallons; it was merely a computation for purposes of comparison with other values per million gallons. It is very convenient, but I do not regard it as a value per million gallons, except that it is obtained by that division. By reason of the absence of sales of water rights for the purposes for which this water is used in this community, it is impossible to determine the general value in the community based on the use of the water per million gallons. I said that this \$54,000 per million gallons per day does not necessarily represent the value of the water in general use in the com-

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SPRING VALLEY WATER CO. VS. CITY AND COUNTY OF SAN FRANCISCO

munity. The value which I have stated as a whole is the nearest approach to the general value based on the use of the water that we can get in the absence of any other sales or purchases of water rights in the community, other than this specific instance with which we are dealing.

When I say that these water rights have certain value, I mean: The value of any property is determined either by ascertainment of the net profits to be obtained in its use capitalized, or by the market value established by sales, that is, the value which both the buyer and the seller agree upon as representing a sum which both can agree upon. In the same way, the value of these rights would be the value which they could command in sale, and upon which they could earn interest based upon the net revenue. The value, as I have determined it by this original cost method, represents, in the best of my judgment, an amount which would be arrived at in a sale of these rights, or based upon the revenue to be derived from their use under the existing conditions. I said yesterday that there might be a difference between the value of these rights for rate fixing purposes, and for sale purposes, but I did not say that there was necessarily a difference. Since yesterday I have given the subject of their value for the purposes of sale more thought. I thought along that line after the discussion of yesterday to a greater extent than I had previously. I had not the intention yesterday, and don't think I so implied that the value for sale purposes of necessity would be different, and certainly would not be greatly different. I merely expressed the statement then that it might or might not be the same, and I still think that there might be elements to be considered, which, in the instance of a valuation for sale might result in some different amount. The existence of a rate fixing body might be an element to be considered.

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Questioned by Master.

The actual revenue earned by the water rights would be an element to be considered in the sale. In this instance the purpose is to ascertain what this revenue should be; in the case of a sale the revenue would be known, and at the present time both of those matters are passed upon by the Railroad Commission. There cannot be any difference between sale value and rate fixing value with the Railroad Commission in existence as today. If the Railroad Commission, or any other rate fixing body, should fix a value for sale at a certain amount, or by a certain method, they could not very well thereafter, with justice and consistency, fix rates on a different method, or at a different amount.

CROSS EXAMINATION BY MR. McCUTCHEN.

In the absence of a market value which can be ascertained by sales in the locality, the tendencies which are exhibited by the Railroad Commission would have an influence on market value which

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would be of great importance in the absence of a number of sales, or of recognized market value based on exchanges between buyer and seller. The general tendency, in decisions, has been toward the original cost, where the market value based on sales was not available—this tendency being exhibited by the Railroad Commission.

Whether or not value for rate fixing purposes, and value for the purposes of sale are the same thing would depend, under the existing conditions, upon the consideration that was given by the Railroad Commission to possibly such an element as the cost of the next available supply to the purchaser; generally speaking, I would think that this consideration by the Railroad Commission would not have much weight, and that the value would be practically the same, but there might possibly be some difference due to that reason. It is a possibility. That is the reason I cannot answer the question, "Yes" or "No," because there are elements that might be considered that would have to be assumed in the question.

For the purpose of determining the value of this property, if the question involved were one of sale, I think his Honor should take into consideration the cost of getting another set of water rights that would perform the same office that these water rights are performing. I don't mean that that should be conclusive, but it should be considered. For the purpose for which I have been considering the value of these rights, it is my understanding that that is not the basis which has been laid down by the Courts in the matter. In connection with the sale, there is the purchaser's point of view to consider as well as the seller's, and there is here no purchaser involved, nor is there a seller involved here.

There is no water right being sold here. I don't see anything in common between using a water right and selling a water right. I do not think that value for the purpose of taking over bodily of a water is a very different thing from the value considered with reference to taking the exclusive use of that right as against the man or company which owns it. I have said several times that the value of the rights in use which we are considering here in connection with rate fixing would probably under the present conditions correspond with that in sale, but it might not. If I had been called upon to express an opinion on the value of this property before the advent of the Railroad Commission, I probably would have to think of it for some time before saying what my yardstick would have been under those conditions; it is entirely a supposition. I do not say I am following any rule of the Railroad Commission. I am considering the influence of the Commission in determining market value, in view of the fact that there are no sales which express the common opinion of the buyer and the seller in the community. That has been so with reference to properties of this kind in this locality, but there are some localities in the West where records of water right sales are available. If I had been called

upon to testify as to the value of these water rights in one of those earlier cases, before the Railroad Commission came into existence, I see no different rule at the present time that I could have used from the one I have adopted. The Railroad Commission certainly has brought about an inference which is operating now in its influence upon market value. My point of view is the influence that the Commission has had, not that it has laid down a point of view to be followed at all, but it is an inference to be considered. It should influence his Honor to the extent only of the influence that the tendencies of the Commission have upon market value.

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Questioned by Master.

I think his Honor should make market value the test if it can be found. I think that the original cost is the nearest approach that can be found, and practically is the only exact figure which can be arrived at as the market value; not only the influence of the tendencies of the Railroad Commission, but also the fact that the company has actually paid this amount, and there being no other exchanges of which we have records in the community which are comparable, that of itself has tremendous influence in establishing market value, the very fact that this amount was paid. That assumes that there has been neither appreciation nor depreciation in value to the extent that that influence is considered, namely, the fact that was paid for these rights; then again, there is the consideration of what these rights might be purchased for today. That has nothing to do with the actual figure arrived at by determination of costs, but in the selection of cost as the best evidence of value the cost of reproduction would be an element to be considered as I considered it in that case. I did not consider it any further than it was estimated and rejected on the basis of its being speculative and indeterminate.

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My judgment as to whether it would be more consistent to increase my market value from the market value of a past time representing the cost by some rate of appreciation, or rate of depreciation, as the case might be, is that the large sums paid in early years for rights acquired by this company, for which no commensurate rights were obtained, would result in large depreciation as well as any appreciation which might have occurred in instances of other rights acquired. It appears to me they paid more than the rights were worth; in the instance of Lake Merced the payment of \$150,000, for which I have been unable to determine any specific right which was acquired, and also in the Calaveras purchase some \$700,000 or \$800,000 of that is not ascribable to any definite right which is commensurate with such an amount, so that in considering the appreciation there would also be depreciation. I assumed that one would balance the other, and left it at original cost to the extent of the reproduction estimate which I made, and which automatically eliminated the

amounts paid, for which nothing appeared in the way of rights, and also which included appreciations based on a percentage, and I found that this amount did not differ much from the original cost.

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CROSS EXAMINATION BY MR. MCCUTCHEN.

It is my judgment, taking into account all of its ramifications, that the value of those rights the day after they were purchased would be practically the same. In stating that, I considered the value as a whole, not its component parts. It is not my opinion that each right was worth the day after its purchase what was paid for it; in the case of the Lake Merced purchase, and the Calaveras purchase, I do not regard these rights as having been worth what was paid for them. My statement of yesterday, and my previous statement that the amount paid represented the worth of each right the day after it was purchased, would be an error with respect to the individual rights; what I had in mind then was the grand total of these rights as we have it today. It is hard to make any specific date when that value did attach, but I certainly think that it attached within the period which we are considering. The \$176,000 which I make the rights worth more in 1913 than in 1907 is due to the cost of additional rights acquired. Whatever rights existed in 1907 were worth \$1,756,000, but as to how long they have been worth that I have not given that matter consideration sufficient to specifically state. The amounts were determined by beginning with the first purchase and adding the amount paid annually for water rights, and I determined the amounts to represent the value during that particular year 1907 and on.

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As to what was the value of the water rights which the company now owns on this side of the bay, leaving out Lake Merced, I have not given consideration to that matter; that is, taking parts of the system, without further thought on the matter I do not feel that I could state what my opinion is as to the value of the water rights on the Peninsula immediately after their acquisition. I could not state how long before the commencement of these suits these water rights became worth the values which I have attached to them. I do not think it possible that they may have become worth those sums at a time long prior to the institution of the suit, in view of the fact that sums were paid for which there was no commensurate right acquired. With regard to the San Mateo Creek rights, it may be possible that they may have become worth those sums that were paid for them at a time long prior to the institution of these suits, in view of the fact that the utility of the rights which were acquired there, the riparian rights, has not increased in recent years. I assume that these rights, as far as my knowledge extends, were availed of from and after the completion of Crystal Springs Dam. I think these rights were worth in 1890 what had been paid for them. With reference to the San Mateo stream and tributaries, I am not in doubt now as to whether

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the moneys which I found to have been paid for water rights on the Peninsula covered all the water rights which the company has availed of since 1890. Any prescriptive rights that might have been acquired there were re-absorbed by the lands. Any prescriptive rights which the company may have acquired there would be with respect to the lands which they later acquired, so that the lands would have re-absorbed that value. If the company had acquired as against certain lands the absolute right to make a diversion of a certain quantity of water from that stream, that right would have ceased to have value as soon as the company purchased those lands as against which it had acquired such a right. The purchase of a right from the owner of riparian lands consists in obtaining the permit to divert the water from the stream which passes through his land, and does not buy from him a right to use water, for the reason that his right does not extend beyond his land; he can only use the water on his land, and when such a right is acquired by prescription without payment, and the land is later acquired by the company, or individuals who obtain this prescriptive right as against the land, it is my understanding that any value of such prescription is absorbed in the value of the land. I understood that from talking with Mr. Searls.

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Assuming that on a portion of the stream flowing through the public domain that I had acquired the right to divert 100 second feet, and that Mr. Searls owned a piece of land on that stream below me, and that I bought his land subsequently for a reservoir, as I understand it, the prescriptive right in that case is assumed to have been acquired as against lands above the land owned by Mr. Searls.

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Mr. McCutchen: Q. The Upper Crystal Springs Dam was constructed upon a running stream, and the water of that stream was held back, and it was held back for such a time as to have acquired a prescriptive right as against riparian proprietors below. Now, do you state that under those circumstances the purchase of that riparian land below, possibly for reservoir purposes, or for some other purposes, would operate to extinguish any value which might exist in your right to divert by prescription? A. My understanding is that the value of these lands, as valued by the City Appraisers, has included the value which might be ascribed to the flow of the stream, or the water on the lands; this is the assumption on which I made my statement. If the value of the land was diminished to that degree in the City Appraisals, then my statement would not be correct.

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The value of these water rights for irrigation purposes is worth very little; for domestic purposes, in my opinion the right to divert them is, during the period under consideration, worth no more than was paid for the lands and structures and riparian rights. I am resting my valuation on the assumption that the values of lands as against which prescriptive rights may have been temporarily acquired by the

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9921 company, are today in the city's valuation inclusive of such value. In that particular instance of the Upper Crystal Springs Reservoir, my valuation does not include all of the water rights, but includes that portion of them that was acquired independently of the purchase of lands; the other element being included, however, in the land valuation. I do not think that if I were to look at these water rights independently of the lands to which they are riparian that my valuation might have been entirely different; if the right to divert the stream, as against the lands between Upper Crystal Springs and the Crystal Springs Dam, had been acquired through purchase, there would then be a different situation; it would have been possible to express this amount in a known sum, and this could have been deducted from the value of the lands, but as it is now, the two dove-tail together, and it is impossible to separate them. I have said that this value is taken care of in the value of the land, as its value has been determined by the City Appraisers, and that in a total valuation of the property this value is included.

9922 If the rights against the lands between the two dams had been purchased for a fixed sum, and these lands had afterwards been purchased to be used for reservoir lands, the sum paid for water rights in that case would be taken into consideration by me in determining the value of water rights, but I do not say that in as much as the rights to divert the water were acquired by adverse use, as against the land between the two dams, and that land was subsequently purchased for reservoir purposes, that it is my opinion that those water rights have no value. I say that the value is included in the value of the lands as appraised by the city. My understanding has always been that the value of those lands, as fixed by the City Appraisers has been inclusive of any value which would attach to them because of the water. If the city had not attempted to show by experts on other branches of the case that the value of the land included the value of the water rights, by the method I have used this value of the water rights would be greater than what I have ascribed to them by the amount which is now represented within the value of the land, due to the waters being available to the land.

9923 The gross value of the rights in use is much greater than the value I ascribe to them, but that is inclusive of cost of structures and lands, and other elements. I think the amount expended by the company, which I have taken as the value of water rights on the Peninsula, gave the company the right to divert all the water which it is now diverting by and through that system.

9924 What I valued in the way of water rights on the Peninsula was the right of the company to take and use the water that they have been put in the position to take and use by the acquisition of lands, the construction of certain structures, and the purchase of water rights. The

value of those rights, as I have determined it, is the value over and above the cost of the lands and structures necessary to giving this right. The rights the cost of which I ascertained and detailed in my report were those same rights. I have valued all the rights which the company acquired over and above lands and structures, and the value as I have determined it by the cost method is the value of the rights which the company acquired by virtue of which it actually diverts and uses the water. The water which is stored and diverted from reservoirs is so stored and diverted by reason of the ownership of the lands surrounding and above the reservoir, as well as the acquisition of the riparian rights below.

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The purchase of the reservoir lands and the lands above the reservoirs on the Peninsula sources put the company in the position of storing and diverting the flood waters of the stream without interference from any source. The company expended considerable sums of money for the construction of the structures necessary to develop that water and make it available. The structures would certainly have been necessary to develop the water whether the company had paid for the rights, or had gotten them without payment of any consideration. The value of the right is a gross value, and in order to make the yield of the rights available it is necessary to deduct from the gross value the value of structures and the lands necessary to make that use available. This is the method used in the Denver case, where the structures and the lands necessary to make the yield of the Lake Cheeseman rights available, for instance, were deducted; the difference after deducting structures and lands is the net water right value. In this instance the value, in my judgment, is made up entirely of the cost of lands and the structures, and what rights were necessary to acquire by purchase from the riparian owners on the stream below the storage sites. I used those elements in arriving at the value of water rights in the market value method, and then I rejected that method. I found that by that method the value would be far less than the actual original cost of these rights, and for that reason it was rejected, and I then went to another method. That other method, in my judgment, was to show a sum which covers all the rights which are in use. Considering the sum total, as I arrived at it, it fully covers the value of all the rights that are in use on the Peninsula, together with an apportionment of the sum which I added in order to take care of any possible omissions.

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I don't see that there is any proportion to be stated between the right to divert water as acquired in the purchases that I refer to in my report, and the right to divert acquired by the purchases of land or by prescription. The total amount, as I have estimated it, is the cost of these water rights, together with the value of the structures and the lands altogether which make up the value of the system. The value of the water rights is over and above the value of the lands

and structures, and the various elements altogether make up the elements necessary to permit the company to make diversion and use of the water. I have not gone into the subject of land values, and I have not gone into the detail to know whether the structures are worth what they cost. I assume that the structures are worth what they cost for the purposes to which they are put. I assume that the value of these structures as determined by the appraisals in this case, together with the value of the water rights as I have determined them, together with the value of the land, would make up the total value of the property. I have not accepted any specific appraisals of structures. When his Honor shall have found what the value of the structures is, and what the value of the real estate is, those values thus determined, when increased by the value of the water rights separate from such elements, will give the value of the property as a whole necessary to take and use this water. When his Honor shall have found the value of lands and the value of structures, there will be nothing else to value except water rights, and any other elements that may enter in, besides what I have spoken of.

I have in one of my memoranda stated the yield of the rights which are in use, which corresponds with the yield of those rights for which I have estimated the original cost. I mean by that that as to the Peninsula that 19 million gallons per day is the yield of the Peninsula rights as I have stated in my memorandum. Those rights were acquired through the combined result of the acquisition of riparian rights, the purchase of lands, and the construction engineering works necessary to develop and deliver the yield. The company has acquired certain rights, the yield of which is 19 million gallons per day; these rights have been acquired by virtue of not only the acquisition of certain riparian rights which are not in any sense of the word the purchase of a water-right from a riparian owner, but merely the payment of a sum, as the result of which he agrees not to object to the diversion; this, together with the acquisition of lands and structures, puts the company in a position to make the diversion. After the company had purchased these riparian rights, it still had to acquire the lands which would be flooded by storage structures, and it also acquired lands above these storage structures clear to the head of the drainage area. The possession of the riparian rights, and the land above the dam-site, was sufficient to make the diversion.

It was necessary for the company, in order to avail of the right to take these waters, to acquire not only those rights which I have used in my report, but to acquire additional rights, and in this particular instance it acquired those additional rights by the purchase of lands, and those lands are included in the valuation, so that any value to which they contribute an element is included in the total arrived at by the assemblage of the various elements in the final value of

the property. Without knowing what those lands cost, or how valuable the water right appertaining to them was, I still say that the value of the right to divert the 19 million gallons on the Peninsula was approximately \$200,000. I regard the value of these rights as embraced within the value of the lands, and the cost of the riparian rights. I certainly regard \$200,000 as not being less than the value of these rights in use. I am considering the net value when I make that statement, and that is correct, according to my views. As a gross value, those rights are worth more than \$200,000, but as a value separate and distinct from any value in connection with the lands and structures, or other elements necessary to make available the yield of these rights, I consider that their net value is not over that amount. It is stated as \$187,783.60. This is the cost of acquiring the riparian rights separate from lands. If they had only cost \$187, what they would be worth today would depend upon the relative value in proportion to the value as determined by my market value method as near as we can get at it. A certain consideration should be given to the market value of these rights in the alternative use, and although I have not given the subject full consideration at this time, I think in general the market value is determined by the market value of localities that then would be used.

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Questioned by Master.

On the assumption that the value of water rights there represented the market value in the locality, I mean that if these rights of 19 million gallons daily on the Peninsula were acquired by gift, I would take the nearest substitute supply as a measure of value; for instance, the cost or value of water rights over in Alameda County.

CROSS EXAMINATION BY MR. MCCUTCHEN.

Under the circumstances, the only basis upon which market value could be determined for water rights over there would be by their worth for irrigating lands around Niles. In each case I would understand that the water was physically available for use in San Francisco, but the purpose of using the market value method is to get a value independently of the particular use which is being considered. The adoption of the value of water in orange culture certainly is no more applicable than the value of a business block would be to farm property. I recognize that the use of water in irrigation is a commercial use, and that its use for domestic purposes is to supply the absolute need of human beings, and has been regarded by the courts as having precedence over the use in irrigation, but I have no reason which leads me to believe that the value of rights used for domestic purposes is any greater than the value of the rights used for some other purpose in the locality.

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Questioned by Master.

It must be worth at least as much.

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CROSS EXAMINATION BY MR. MCCUTCHEN.

Water can be considered as scarce for domestic purposes in this locality. I do not think it can be considered any less scarce for that purpose in this locality than it is for the irrigation of citrus fruits in most of the citrus districts in Southern California. I don't think that the need for water for the irrigation of orange groves and lemon groves in Southern California is any greater than the need for water for domestic use in and about San Francisco, considering the relation of supply and demand. The average of the net values as I determined them in citrus culture is \$90,700, and I found that the net value for the water in use for citrus culture in that district—Southern California—to be \$90,000 by the market value method. I found by the same method that the market value of the water on the Peninsula was only \$8,000 per million gallons in the use to which that identical water could be put; this water could not be put to the use of citrus culture.

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Questioned by Master.

It is quite possible if citrus culture were prevalent in the region of the Niles Cone, or in Santa Clara Valley, and the water could be put to that use, that it would have a market value recognized in the community commensurate with its value in Southern California. In that event it might possibly be that the net value of the water rights of the Spring Valley Water Co. might exceed the original cost, and that would put an entirely different situation on the matter.

CROSS EXAMINATION BY MR. MCCUTCHEN.

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The only water rights which the Spring Valley acquired on the Peninsula for the last seven years were those which it had acquired by purchase of water rights, or by purchase of lands, unless possibly there were certain rights acquired on Pilarcitos Creek with reference to lands which may have been in public domain, such rights possibly by prescription, but I think I have fully covered the value of any such rights. What the company acquired by the purchase of these riparian rights was the right to divert from the stream the normal flow as against the riparian lands below the dam-site. As I understand it, the riparian lands have the right to the continued flow of the normal flow of the stream, and that flood flow waters are not included in these rights. The normal flow, as near as I have been able to ascertain, was in the neighborhood of 1,125,000 gallons per day.

Questioned by Master.

By normal flow of the stream, I have in mind the flow during the summer. There would be a certain normal flow during the winter which would be larger than the summer flow. When I made the statement, I meant the normal flow during summer and fall months.

CROSS EXAMINATION BY MR. MCCUTCHEN.

By the purchase of riparian rights below the big Crystal Springs Dam, the company acquired the right to divert the normal flow of the stream as against those lands, and acquired it, not by a grant of a water right, but by sufferance; in other words, the riparian owners agreed not to object to the diversion, and they made that agreement, as I understand it, at the time the purchases were made. I think at the date of the grant of those riparian rights the company must have owned land at the site of the dam, because the rights were purchased just about the time the dam was being built. Not having yet completed its purchases with respect to the lower riparian lands, the company would have no right before the purchase to divert water, except with respect to the very small proportion of the normal flow of the stream, which might have been diverted at San Andres and the Upper Crystal Springs Dams, but these are both at the upper ends of the drainage area, and the amount of water so diverted would be very small as compared with the total normal flow of the stream. I do not recall for the moment the quantity of water the company was supplying from the Peninsula sources before the construction of the big Crystal Springs Dam. I have not any data to tell how much of the total yield of 19 million gallons the company was getting prior to the construction of the Big Crystal Springs Dam. I think that 15 million gallons, which Mr. Herrmann testified to, is considerably in excess of what it actually was. I had in mind the fact that the present yield of the Lower Crystal Springs, in making that statement, is regarded as about $9\frac{1}{2}$ million, and this deducted from the 19 million, would give something less than 15 million.

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I do not understand that the water impounded in the Upper Crystal Springs Reservoir prior to the construction of the big dam was diverted. I have not given the matter detailed attention lately, and I could not state off hand what was done with that water. Apparently, 10 million of the 19 million gallons, must have been susceptible of being gathered and used prior to the construction of the Lower Crystal Springs Dam. Almost all of that would be storm water. The right to divert such water would be acquired really by the ownership of the land, the storage site, building the reservoir, and possibly lands above.

I do not know whether any part of the water that gathered behind the San Andres Dam was allowed to flow on, but, as I stated, the portion of the normal flow which would arise from this part of the area would be very small as compared with the grand total flow passing down the main stream. I have not the data at hand as to how much is recoverable from the San Andres watershed. I have found no record of payments for water rights separate from the lands indicating that the company paid anything for the right to hold back any of that water. The very small percentage of the

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normal flow of the stream which originated above that dam, if that was not allowed to pass down the stream, might pass the dam, the right to divert such might have been acquired, but it was very small and negligible as compared with the normal flow of the stream.

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I think that the amount which I have arrived at as the value of these rights covers any right that any owner might have further down to insist that flood water should come to his dam. It covers the San Andres right for the reason that I have stated, that the amount of water involved is so very small that it is negligible as compared to the amounts we are considering. I have been speaking of the proportion of the normal flow to the 9 million, or whatever it is, that it is inclusive of the flood flows as well as the normal flow, and that the proportion of the flood flow to the normal flow on that stream is very, very large. The right to control and use this flood flow, as I have been informed, is a matter of who can catch such water and place it under control. The man who catches it certainly has to make expenditures for lands and structures in order to make such diversion. If he only makes an expenditure for the lands and structures necessary to divert the water, he owns it if he can put it to a beneficial use, but I have shown the value according to the nearest approach we could obtain, is very small, and considering the gross value of the water thus developed in use, and deducting therefrom the cost of structures and lands, would be negligible in this locality.

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Mr. Herrmann: There was no data kept as regards any waste in the early days of the flow of the creeks between the San Andres and Upper Crystal Springs Dam, and that is the only way in which water could be allowed to go down there through the waste-way.

CROSS EXAMINATION BY MR. MCCUTCHEN.

Mr. Lee: I admit that that gross water right is not covered by my valuation, but it is covered by the valuation of the lands and structures which form a portion of the total property. At the time of the construction of the big dam at Crystal Springs, as I understand it, the company merely purchased the right to divert; that is, the consent of the riparian owner to allow diversion to be made. As near as I have been able to ascertain, the riparian owner had a right in the summer-time to some $1\frac{1}{4}$ million gallons; that is an assumption. I have no idea what flow they had a right to in the winter-time, but it is some amount larger than that. The normal flow in winter, and flood flow, are entirely different, according to my way of looking at it. Subsequent to the date of the construction of the San Andres and the Upper Crystal Springs reservoirs, the company held back a certain portion of the flood flow which originated above the dam. That portion, compared with the whole drainage area is

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small. As I understand it, the riparian proprietors below have no rights in the flood flow of the stream. I do not think it is possible to state in fractions what proportion of the entire flow above these dams was held back as flood flow, without detailed daily record of flow of the stream. It is my understanding that the company acquired the right to take that flood flow by virtue of the ownership of the lands and the building of the structures. As I understand the legal situation, if anybody else had caught it, he would have independent title to it, or he would have acquired the right to divert the water by reason of having caught it. It is possible that a small percentage of the normal flow of the stream which the construction of San Andres and Upper Crystal Springs Dam made possible to withhold, might have constituted a right in the company as against the riparian proprietors below the Lower Crystal Springs Dam.

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If the company had already acquired that prescriptive use, it did not have to buy it as against this small flow, but in my opinion it is a small amount, and my valuation of the rights of the company fully included that. That is to say, that the quantity which it acquired by prescriptive use was small, but I have fully covered that in my opinion in the total value which I have found for the rights of the company. You see there is an amount of some \$95,000 odd represented by this 5%, which is available to cover such elements as might have been omitted; in my judgment the value in the total value covers any element of that sort. The value of that right within 5 years after the building of the San Andres Dam, which was built in 1868, would depend entirely upon the gross market value of the yield of water rights in use in that locality at that time, after deducting the cost of the structures and lands. It depends entirely whether after ascertaining gross market value in the community, and deducting cost of the lands and structures, as was done in the Denver Union Water case, whether the net obtained was zero or not; in my opinion, it would have been nominal. Whether the right to divert those 10 million gallons daily, assuming that the company at the time of the construction of the Lower Crystal Springs Dam had that right would have been worth \$34,000, would depend entirely upon whether after determining the gross value of water rights in that locality, and deducting therefrom the cost of structures and lands necessary to develop water for that use, a net value or not remained; if it did remain, when applied to these 10 million odd gallons, then it would be some quantity in addition to the \$34,000. What I have just explained would be the working out of my method as I have followed it. Considering the rights in toto as we have them today, that method cannot be used in this case.

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I have not said that the market value method cannot be used because it is a rate case, and not a sale case. I would not use the market value method in a sale case for the reason that the value of the rights

9948 thus determined would be less than the original cost of the right. My cost method might, or might not be applicable in the case of the right of the company to divert 10 million gallons daily at the time of the construction of Crystal Springs Dam. It depends entirely on the conditions at that time, and the market value at that time, and the cost of the structures necessary to develop the rights of the land, to devote the rights to the use to which the water might be put. I have no item of cost in my figures or statement that would include the right to divert that 10 million gallons, except the purchase of a few rights on Pilarcitos, other than the amount which might be apportioned to that from the 5% on the grand total. There is none in my estimate, for the reason that my estimate is a determination of the value of the water right separate from the lands and structures; the value as I determine it, together with the value of the lands and structures, and other elements entering into the value of the property in the aggregate, would represent the value of the property to the company. My valuation is a valuation of the water rights of the company independent and separate from any valuation of the lands and structures.

9949 I have valued the right to take 19 million gallons of water from the Peninsula sources in the light of the fact that the company does own certain lands, and that those lands and structures upon them are included in the valuation, which, together with the value as I have determined for the water, which I excepted from the land, would make up the grand total. It seems to me that the assumption that one concern owned the water rights, and another concern owned the land and structures, is not susceptible of an answer as to whether it would be possible to determine what the water rights were worth in that case. I cannot conceive that the lands and structures alone without water would amount to a system. The value of these water rights as ascertained alone and independently of any lands and structures, is a value much less than the original cost, and therefore, to adopt such a value in this instance would be manifestly unfair and unjust to the company. I have not taken the cost of only a fraction of the water rights and said that that represents the value of the whole. The value which I have determined, namely, the original cost, is the value over and above the value of the lands and structures necessary to develop and make available the yield of all the rights of the company used in supplying San Francisco; my value, taken together with the value of the lands and structures and so on will make up the grand total value which will cover all the elements involved.

9950 I know where the Uper Crystal Springs Dam and the San Andres Dam are. I know that the company had a reservoir known as Upper Crystal Springs Reservoir, and another known as San Andres Reservoir, long before the Lower Crystal Springs Dam was constructed, and I know that the company was impounding water in each of those

reservoirs, but I have not the full information in my mind at the present moment. I found no information indicating the amounts paid to the land owners for the right to hold back waters in these two reservoirs, but at a date subsequently the company acquired lands below the Upper Crystal Springs Dam and the Crystal Springs Dam, and some of the lands below the San Andres; any rights that were acquired by prescription as against these lands would be absorbed at the time of such purchase. There are no specific entries in my statement of purchases, showing the payment of anything for the right to take water from the Upper Crystal Springs, or from San Andres, as against the land owners below, although the land value in connection with the value of the water rights would involve such an element of value. I find no record of amounts paid to these riparian owners below the Lower Crystal Springs Dam for the right which the company availed of to hold water back in Upper Crystal Springs, and in San Andres, prior, most of them, to 1886.

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If, as Mr. Herrmann has testified, the average flow past those two dams was only $4\frac{1}{2}$ million gallons per day, then the company had acquired in some way prior to the purchase of the riparian rights below the concrete dam the right to take all of that 19 million gallons, except an average flow of $4\frac{1}{2}$ million gallons per day. That is taken to be correct. The value which attaches to that 15 million gallons per day, over and above that which is included in my valuation, is to be found in the value of the lands and structures necessary in connection with the development and diversion of the water at these points. The company paid, as I estimate it, per million gallons for the right to cut off that flow of $4\frac{1}{2}$ million gallons per day in San Mateo Creek, \$187,783.60. Considering its gross value in use, I do not think that that $4\frac{1}{2}$ million gallons was worth any more per million gallons than the 15 million gallons which the company had already acquired the right to divert; considering its net value, that would depend upon the cost of the structures and lands in each instance necessary to develop the two amounts. From my method, using the original cost, I have not gone into the quantities at all; it is not possible, by that method, to indicate whether the right to divert 15 million gallons was worth as much per million gallons as the purchase price to divert $4\frac{1}{2}$ million gallons. By the market value method I have, and therefore, the reason that the consideration of lands and structures would make the amount even less than I have already shown in my third memorandum. I did not go into the detail of it; I just applied a value of \$8,000 per million gallons to it as ascertained on Alameda Creek.

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The right to divert 19 million gallons daily from Peninsula sources is not worth more than the value which I have attached to those rights in my statement, when determined by the cost method. In my opinion, the value, separate from lands and structures, and

other elements, is no greater than the amount I have ascribed in my estimate.

9954 Mr. McCutchen: Q. Mr. Lee, will you be good enough to answer the question whether or not the right to divert the 19 million gallons of water per day from the Peninsula sources is worth these figures you have arrived at by the application of the cost method? A. I cannot answer it by yes or no.

9955 Mr. Lee: I am unable to state by resorting to my cost method what the value of the right to divert 19 million gallons of water daily from the Peninsula source is. I do not see how the amount can be split and ascribed specifically by the adoption of that method as I have used it. I am unable to state for that specific quantity of water what the value is. I do not see that I can state in money the value of the Spring Valley Co.'s right to divert the water which it does divert and has diverted from Peninsula sources. I know this in regard to the value of the right of the company to divert the water which it does divert from Peninsula sources, that the net value of that right is less than the amount I have ascribed as the value. After further thought, I do not see how I could make such a segregation. I have not given consideration to the separate items in that way. I considered the rights of the company as a whole, and feel that I have arrived at an amount which represents very liberally the value of all the rights of the company in use over and above the value of lands and structures, but to split that up and segregate it, I have not considered it. I could go into the details of that, and possibly, by some study, answer that question, but I am not prepared to do so at the present time. I am not prepared to state whether it was worth 9956 approximately \$200,000. I consider that it is worth in the use to which it is put more than \$200,000, but I could not state the amount any more definitely than that.

ONE HUNDRED AND THIRTY-SIXTH HEARING.

APRIL 13, 1916.

Witnesses: CHAS. H. LEE for Defendants.

W. A. BISSELL for Plaintiff.

9958 (Certain corrections noted in the transcript.)

Mr. Lee: The question of what the right to divert 19 million gallons of water from the Peninsula sources is worth without regard to ownership of the land from which the water comes, seems to me is not susceptible of answer by the original cost method under the con-

ditions which the company acquired its rights, for the reason that they were acquired by the acquisition of lands and the buildings, and the acquisition of riparian rights. By the market value method, however, a value irrespective of lands and structures may be applied, and that value, based on the market value in the community, is \$8,000 per million gallons a day, or as applied to 19 million gallons it would be \$152,000.

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CROSS EXAMINATION BY MR. McCUTCHEN.

That, in my opinion, is the value of the rights considered with respect to the market value of the rights in this locality. Considered as the market value in the community, I think those rights are worth no more than that, but for the purpose of fixing a value in a rate fixing proceeding, I regard the original cost of the rights, taken as a whole, as being the proper one to use. I see no way in which the two methods that I have used can be put together. If his Honor concludes that cost is not value, but is one of the elements to be taken into consideration in determining value, that would lead him to some value less than the original cost that I say. How much less would depend entirely on what weight his Honor placed upon the market value of rights, irrespective of lands and structures in the community. Taking into consideration all the elements necessary to determine value, I say that the value of these rights is the original cost of these rights, taken in connection with the value of lands and structures and other elements entering into the value of the property.

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The value of the rights as determined by the market value method represents the total value independent of, and irrespective of any value which may be in lands or structures, and this his Honor always has to fall back on. I consider the market value, as I have determined it, as being indicative of the value of these rights, based on the market value in the community. I do not think I have said that his Honor would be perfectly safe in one case in taking the cost of water rights and adding that cost to the value of the land, and in the other case would be perfectly safe if he took the market value of these rights and added that to the value of the land, for the reason that I have stated that the use of the market value, the addition of that to the value of the lands and structures, would work an injustice to the company in that it would not protect it in its investment in water right purchases. My statement has been that the value of the lands and the structures necessary to develop the yield of the Peninsula rights, plus the cost of water rights, would result in a value which fully represented and included all water right values.

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If his Honor found the value of structures and the value of land, including all water rights other than those represented by these purchases, and added to those two sums the aggregate amount of these purchases with any other element of value that may appear to him

9962 may be necessary to be included, he would get the value of the property down on the Peninsula; and by value of lands which represent water rights is also included the value of the structures. By the original cost method the question is not susceptible of answer for the Peninsula alone; the whole system must be considered and totally considered. I am unable by the original cost method to lay down any method by which his Honor can determine the value of that property down there, if disconnected from the Alameda sources. There
9963 is the market value method, which might apply. If the court finds the value of the structures and of the land and the water rights by the market value method, he would have all of the elements of value then, except as to any other element, such as going value, or other intangible value that might be included. I am not giving any opinion in regard to that at all. I do not consider that he would have a value which was sufficiently large to be placed upon that property in this rate fixing proceeding.

9964 As I understand the legal construction of a water right, it is a right to the continued flow, or occurrence of water in nature, and the use thereof as against anyone else. That is, against the world. Considered irrespective of the land which the company owned, it acquired the right as against other riparian owners lower down on the stream. Take for instance San Mateo Creek, and the owners of the lands above, protecting it from possible appropriation from above and diversion from above.

9965 Looking at it from the standpoint of a profession, I think it is rather a broad question to state who is the best qualified man to express an opinion on the value of water rights. I think men who are engaged in the organization of water projects, or the buying and selling of water rights, might have ideas upon that which would be very illuminating. There are certain other phases of the subject which possibly the legal profession can give very illuminating ideas upon. I think that with regard to water rights that although the hydraulic engineer has an opportunity to form intelligent opinions in the matter, this subject is such a broad one, and touches the community in so many aspects, that I think men of other professions have valuable opinions in the matter. I have not had any experience, except indirectly, in buying or selling water rights. I was called here to lend what aid I may be able to, solely on account of the fact that I am an
9966 hydraulic engineer. It always has been customary in the past for the hydraulic engineer to express these opinions.

I think there are elements which the engineer alone is qualified to consider, and other elements which the man in the legal profession is alone qualified to consider. It is a subject which involves both these elements. I have specialized along the line of engineering, and as far as we can in specializing on one subject, I have gathered in-

formation and knowledge on other subjects. I would not think that a man who had specialized in the purchase and sale of real estate alone had acquired very much notion of the value of water rights. I had not any intention of saying that one man in one special field alone is alone qualified; what I had in mind was the fact that the opinions of men in these different professions all would aid in giving different points of view from different angles.

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I recognize it as a possibility that land might have a peculiar value because of its water yield for water production purposes, and it is my opinion in the matter that the value of the land, considered in a judicial proceeding of this sort, should be the ruling market value in the community for all purposes to which the land is adapted, not any specific purpose, unless the land had been bought for that specific purpose, and the price paid was in consideration of that specific purpose. If the only evidence of the value given by a particular witness of a piece of land was for residential purposes, and that witness disclaimed any knowledge or any ability to speak on the subject of the value for water production purposes, I would not take his testimony as covering the value of the land, including its value for water production, and I think I have not had that in mind at all. My point has been all along that the land as appraised by the City Appraisers was appraised with the water available, for instance, this residential value probably influenced by the fact that the view of the lake was present, and other parcels with the same consideration, namely, that there was water available to the land. At any rate, the valuation was made with the assumption that the water fell upon the land and was naturally available to the land. That is my understanding from talking with the appraisers. Mr. Cranston told me that it included the scenic view in overlooking the lake, but he did not tell me that it had anything to do with the withdrawal of water from that source for domestic or other uses. He said he had not considered the value of the land from a water producing standpoint at all.

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I find that the real estate experts included these water rights in their valuation in this way: The consideration of gross value of the water rights in the community, less the value of land as determined by these appraisers, without considering its water producing qualities, less the value of structures, results in a net water right value of, as I have stated, some \$8,000 per million gallons a day; in other words, my discussion of the water right value has been its net value after the cost of lands and structures have been deducted. This is the method used in the Denver Union Water Co. case. I knew that the real estate appraisers had not included any value in the lands due to its water bearing qualities. I have not assumed in my statements here that this land value included any value due to water producing qualities, or that the real estate appraisers had included any such value.

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By the market value method, the value per million gallons of the water right to divert 19 million gallons daily on the Peninsula is the market value in the locality, namely, \$8,000 per million gallons a day. I think I have shown fully that the best method to be adopted in the case is the cost method. I cannot see that I can answer any differently than I have as to what the value of the right is to divert 19 million gallons a day from the Peninsula sources. I have tried to explain it to the best of my ability. The value of that right to divert 19 million gallons of water daily is \$8,000 a million gallons a day, based on the market value in the locality. I cannot cut myself loose from any method of determining it under the conditions.

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I must give the same answer in relation to the Alameda sources, namely, \$8,000 a million gallons daily. If it were possible for the Spring Valley Water Co. to sell its properties to the company which is supplying Oakland with water, and it had decided to make that sale, and I was asked to advise it as to the value of its rights on that side of the bay, I would not tell it that if it received \$8,000 per million gallons it would be getting adequate compensation for its water rights over there. It would not be adequate as between the seller, the Spring Valley Water Co., and a possible purchaser in Oakland for the use of that water for domestic purposes. If the seller was willing to sell, and the buyer was willing to buy, and they called upon me to sit as an appraiser to determine what the buyer should pay to the seller, I would not, under those circumstances, if the seller was the Spring Valley Water Co., and the buyer was some other company to engage in that business, say that \$8,000 per million gallons was a fair price. The Spring Valley Water Co. would certainly be foolish to sell its rights at less than they had cost it. As I stated yesterday, the very fact of the payment of the Spring Valley Water Co. of what it has paid has tended to establish a market value in that use.

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Questioned by Master.

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If the Spring Valley Water Co., for one reason or another, was going out of the business of domestic supply, and wanted to get rid of any rights that it had, and was willing to sell to a company that was engaged in irrigation, then, under the investigation I have made \$8,000 would be the market price, as that is all the irrigationists could afford to pay, but in as much as the water is available and is to be used in this assumed sale for domestic supply, I would consider that \$8,000 per million gallons would not be an adequate compensation. In this market transaction between the Spring Valley Water Co. and the Oakland Co., I as arbitrator would fix a price certainly not less than the cost, and all things considered at the present date, or at a date within the last few years, I think I would not fix a price greater than the cost.

SPRING VALLEY WATER CO. VS. CITY AND COUNTY OF SAN FRANCISCO

CROSS EXAMINATION BY MR. MCCUTCHEN.

The property is not worth any less than it is really worth because there is a Railroad Commission. Possibly I limited my qualification too much when I stated "As of a date within the last few "years". I did not say I considered the value was less than I really thought the property was worth. I see no reason as between a seller and a purchaser in a case such as I have instanced which would impel me to regard the right to divert 14 million gallons a day from the Alameda sources as being worth in this instance less than what they originally cost. In dollars and cents, at the present moment, that is, as of the 31st of December, 1913, I have not given the matter sufficient thought to enable me to tell these two people in the case of the buyer and seller the value of those rights.

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Questioned by Master.

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I stated to the court that my advice would be its cost. I must confess I did not have in mind that property by itself alone. I had the whole Spring Valley property in mind. I would reduce my cost by the amount of the overpayment on account of the Calaveras purchase, but that is something I have not attempted to determine.

CROSS EXAMINATION BY MR. MCCUTCHEN.

How long it would take to determine that would depend entirely on what records were in existence, and the time it took me to get the information needed. In addition to the information that I have already acquired, I would seek to fully ascertain the history and all facts concerned with the rights which were acquired on the stream by that purchase, and the physical property acquired, lands, structures, or other elements. In this instance the sum paid may have included other elements than water rights. In order to tell these two people what the water rights were worth, I would have to have more information about the value of the lands and structures at the time of the purchase. In this case I have considered the matter in toto, and have not attempted to segregate it. That is to say, the water rights in Alameda County, added to the water rights on this side of the bay, are worth a certain sum of money for the purpose to which we have been giving consideration, and in this case we have been giving them consideration in connection with value for rate fixing. Considering the rights of the company as a whole, I regard the value as I have ascertained it as the value of these rights, whether for rate fixing or any other purpose. Of course, there might be some reason for which in a sale a somewhat different value would be obtained, but generally speaking, I think it would be that value for all purposes. I mean that the right to divert 19 million gallons from the Peninsula sources, and 14 million gallons from the Alameda sources, together

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with the Lake Merced, would be worth the figures which I find to have been the cost of acquisition of these rights.

9979 Those rights became, in my opinion, worth the prices paid for them in the period of time under consideration. I have not exactly figured out the year when they became worth those prices. The event that made them worth it was the fact that the water was put to use in supplying the city, and that happened long before the first year in controversy here. There are other considerations; I am unable to state any definite time when the value did reach what I have placed it at. I think there were considerations of appreciation and depreciation so far as water rights were concerned. The depreciation was brought about because more was paid for certain of the rights than they were worth. For instance, the Lake Merced rights for one, and the Alameda rights for another. I could not state in dollars and cents how much too much was paid for the Alameda rights. I have not gone into the detail of the various appreciations and depreciations, and there might, and there might not have been any appreciation in the Alameda right. I have considered the matter in toto.

9980 After their acquisition, when these waters came into full use, assuming that the water is used, and has been used for domestic purposes, they became at that date equal in value to the amounts which had been paid for them. For purposes of rate fixing or sale by the company, I think that there was no appreciation or depreciation in their value. Considered from the market value standpoint, however, even at the date they were put to use, their value is nowhere near the amount represented by the cost of these rights. Their value when

9981 they came into full use was equal to their cost to this company for sale purposes in the use to which it is putting the water. I could not state as to their value at that time for purposes of sale. I have had in mind their value to the company. Whether their value to a prospective purchaser at the time they were first put in use is the same, or not, I have not given thought to, and I do not think it would have been. When I say their value to this company, I do not mean to the Spring Valley Water Co. particularly, but I mean to anybody who would use them for the purpose to which the Spring Valley Water Co.

9982 is using them. The matter that has escaped my attention for a time has been the revenue to be derived from the use of these rights, and that is really what would determine its value at any one time. That was not what determined their value in the period 1907-1914, as given by me in my testimony, for the reason that this is a rate fixing proceeding, and we are trying to find the proper rate of return. That proper rate of return is to be based upon the original cost of the rights of the company for the reason that the market value of the locality, as we can determine it, is much less than that amount. The

9983 rate that the company is entitled to receive is determined upon value,

if the value is one that will not injure the company in its investment. I feel that a company should be allowed a return upon something more than value, if such a return is not a burden unfair and too heavy for the consumers to stand. It seems to me fairness all around is a matter to be considered in determining value for rate fixing. That is the way I have gone about it in this proceeding. I have determined in my own mind that the market value in the community is less than the original cost, and that by adopting the original cost as a value to be used in this case, fairness would be done the company, and injustice would not be done the consumer.

The result of my showing here I think is my opinion of the value of the rights of the company. If I were sitting as an appraiser to determine for the seller of the property and the purchaser who might want to use it for the same purpose, I would not tell him that the rights were not worth more than \$8,000 per million gallons, because they were not worth more than that for irrigation, and that therefore that was all they were worth for any purpose. In that case market value would not be full value at the present time in the present uses to which the company is putting this water. The market value in the community for uses other than for the highest use for which the property was available is \$8,000 per million gallons a day. I excluded uses for which the property is now available and being used in my ascertainment of market value, because there are absolutely no sales of rights for that purpose. I think market value, determined by my method, is applicable as I have used it, for ascertaining the market value of these water rights. I have determined market value for other uses in the community. I think I have arrived at the nearest figure which can be placed upon the market value of this property in the use to which it is put. I do not mean to say that \$8,000 is the limit of value of these water rights for all purposes. The sum which I reach by that investigation represents what I consider as the nearest approach to the market value of this property in its use.

If the cost figures had only been one-tenth of what they actually were, the market value would have been the value for other uses; that is, the \$8,000 a million gallons a day; that would have resulted in a figure greater than one-tenth of the figure that I have actually used. That does not mean that the actual cost in all cases would govern. The actual cost, as I see it, would govern only when the actual cost is greater than the general market value in the community. That is to say, market value for irrigation purposes, or any other use to which the water could be put. Here we are considering the use of water for domestic purposes, and the only other use possible is irrigation. In this particular case water is much more valuable for domestic use than it is for irrigation use. I think that the ratio of the market value as I have determined it, based on other uses and value, as I have

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adopted it in this case, gives in percentage how much more valuable it is for domestic purposes than for irrigation. The ratio of 8 to 54 gives the ratio I speak of. That is to say, 8 into 54 would go nearly 7 times, and I would say that these water rights, considered from their availability for domestic uses are worth about 7 times their market value for irrigation uses. I am talking now of net value of water rights.

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The nearest approach to the market value of these rights which I can arrive at is this original cost, taken together with the values of structures and lands in the system as a whole. I can now see that my way of getting at this ratio between the value for domestic uses and for irrigation uses did not correctly represent my views. The original cost of the water rights, together with the value of the lands and structures, make up the value. These water rights certainly must have some market value, but there are no sales in the community, or other means of determining what this is, and the nearest approach to it is the original cost taken in connection with the value of lands and structures. If I did not know the original cost, the next best method would

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be the market value of the rights in some other use than domestic use. That is a method that has been used where market value in other uses is available. For instance at Denver, in the Denver Union water case, the market value in the alternative uses in the locality has been taken. If there were a granite country, and there was no soil on top of the granite on which water could be used for irrigation, I think that it would be even more a matter of opinion than it is now, just who would guess the best. This, in any event, is dependent upon opinion; the market value is merely the combined opinion of the buyer and the seller. I have no notion that this water will, under any circumstances, ever be used for irrigation. If I were seeking the acquisition of the right to take 34 million gallons of water, and I found that I could go into an irrigation country and buy that right for \$8,000 per million gallons, and I also found that I could come up to San Francisco and Niles and buy this right for \$8,000 per million gallons, I would take the purchase on the Alameda Creek, considered as an investment.

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Witness: W. A. BISSELL for Plaintiff.

Bissell

DIRECT EXAMINATION BY MR. MCCUTCHEN.

I am 68 years of age, and have lived in this country for a great many years. At one time I owned the water company that supplied Livermore with water. I obtained control of it in 1909, and sold it in 1912 to the Pacific Gas & Electric Co. We owned, at the time of the sale the riparian rights on the Mocho, and the Positas water right. The company owned the right to divert and use approximately a million gallons. I don't know that there was ever any price assigned

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by the purchaser to the water rights, but we valued them at \$100,000, and it was one of the items that went to make up the physical property which we sold to the Pacific Gas & Electric Co. In our schedule of assets of the physical property we were to sell, the water right was put in at \$100,000. We discussed the value of that water right with them, and they put their engineers on to the property and went all over it. The water right was challenged by their engineer as to value, and it was reduced to \$75,000 in the final settlement, and that was the price paid for it in the consummation of the purchase. My information as to that reduction from \$100,000 to \$75,000 for the water right came from George Dillman, who was my engineer. It is my understanding that the water right fell slightly short of a million gallons. My recollection is that for thirty days we produced there 27 million gallons, which would be 900,000 gallons a day. That was from the Positas, which is a subterranean supply; it was pumped. I believe it included some water from the Mocho.

CROSS EXAMINATION BY MR. SEARLS.

In the sale to the Pacific Gas & Electric, I sold them the electric light plant and the water plant, and my interest was in the price I could get for the whole thing rather than any particular items. The right on the Positas was a spring. Some of the water there just flowed over the top of the pipe. After I bought the property I put down a big well there which made the main production. I am sure there was more water there that could be gotten by further development, but we were taking all the water that that sump would produce when we got up to 900,000 gallons per day. If we had driven another well on the same tract, I think we could have developed more water.

When I say that our water right was valued at \$100,000, I mean that all our water rights were carried at that figure, but as distinguished from our water rights in our business up there, there was the pumping plant, the rights of way, and the distributing system; those were all separate. The Mocho Creek water right had been partially developed by me. I put in another dam up on the Mocho. This property had been used as a water company before I bought it, and most all of the riparian rights had been acquired before I came into possession of it. I only thing I did was to further develop water by putting in another dam. The \$75,000 covered everything. The Mocho, I think, if it would pay to put in a dam up there, could develop more water, but the Mocho, in my estimation, always possessed very small value as compared with the Positas, because we did not own the watershed, and there was nothing to keep it from being polluted, so that the Mocho was all right to use when the flood waters were running to fill up our reservoirs. The longer we utilized that water supply and operated it as a water company, in my judgment,

the less valuable the Mocho became, and the more valuable the Positas.

9997 Questioned by Master.

There were the improvements at the Positas and at the Mocho, which consisted of a dam. Then there were the two electric pumps, and the distributing system, and the right of way, which were the physical property other than water rights in the water department of the company. The lands were a negligible quantity. The valuable thing at Positas was the water right of the Livermore Ranch, consisting, as I recollect it, of 377 acres which we did not own. We owned a small piece of land, just enough for our pumps to set on. This space upon which the springs were situated, my recollection is, was between 3 and 4 acres.

9998 Questioned by Mr. Greene.

The total amount that was paid for the entire property was \$242,000.

Lee Witness: CHAS. H. LEE for Defendants.

9999 CROSS EXAMINATION BY MR. McCUTCHEN.

10,000 I heard of the sale by the Livermore Water Co. to the Pacific Gas & Electric Co. in reading Mr. Herrmann's testimony. I do not recall now whether I heard it otherwise or not. It was a small quantity of water, comparatively speaking. I don't think that the value of a small quantity of water has any relation to the value of a large body of water gathered together. I think it is quite possible that it might be very much larger. The small quantity of water may be in a locality where other sources may not be available, and yet an individual or a company, for special purposes, may desire very greatly to have a water supply, so that the demand for the supply as compared with the supply is very much greater than in a case of a supply consisting of a very large body of water. In the course of my investigations I traveled through the Livermore Valley. The small quantity of water involved at Livermore demands a very small market. I can readily see that a small quantity of water in that region might have a demand for it very much greater than in the general bay region considered as a whole with respect to a large body of water. I think it is within the range of possibility, considering all the conditions, that the need for water around Livermore is greater than it is around San Francisco Bay. The small radius which such a small amount of water would command, and the legal demand which might arise for such a supply, would make it so. I know of instances in Southern California, where for purposes of improving gardens, or a local domestic supply, an individual who desires very greatly a certain location because of its surroundings and climate,

and he had the ability, paid a very large sum of money for the right to obtain a small quantity of water. Scarcity is a very important element to be considered in determining the value of a water right. The relation of supply and demand might be exhibited by the relative scarcity. The locality in Southern California that I have in mind is along the high foothills, where residences can be very desirably located in the neighborhood of Los Angeles. At Santa Barbara a similar condition exists. It is not a general condition, but one brought about by the local conditions, and the fact that men with the financial ability to obtain anything they desire are acquainted with the country, and like the climate and the location. I am not sufficiently familiar with the location around Livermore to know whether the same situation relative to residential desirability in the foothills holds, but I can readily see that a small amount of water there, if the only supply was in a certain radius, might command a very high figure on account of the demand for it, as related to the supply.

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The Spring Valley supply is the only supply within a radius, but its radius is very much greater than a very small supply, such as the one at Livermore, and furthermore, the supply which may be drawn in large quantities from a greater distance, such as the Sacramento River, or the Sierra Nevada Mountains, which is within range. They are within range considering the demand for water, the volume and the demand. They are not within range from Livermore considering the demand, as it is not sufficiently great to command sources at such great distance. In the determination of value of these water rights the fact that water from the Sacramento River and from the Sierras was available, I gave some consideration, although how much would be difficult to state in exact terms. It has this bearing upon the value of these water rights, that the ability to bring in a large body of water from such sources would tend to influence the local market value for water in domestic uses. The cost of bringing in such water, I think would be the higher limit of the value of existing water. What I have in mind is the value of water in use locally here, and by value I mean the gross value, could not well exceed the cost of bringing water in from the distant source. It would not necessarily equal that cost; that is not the only element to be considered in the gross value of the water rights. There is also to be considered the returns to be obtained upon the use of the rights.

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The conclusion which I reached was—I only considered the matter in a very general way, and not specifically at all. I considered it to this extent; that there was a possibility of bringing water in from distant sources at a cost not exceeding the amount which I ascribe as the value of these rights under consideration. I did not go into the detail of the matter. It was a consideration of the gross value of the rights of the company in use as compared with the cost of water from such supplies as the Tuolumne River or the Sacra-

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10,005 mento River. I don't recall the figures at this time for bringing water here from the Sacramento River, but it was less than the gross value of the rights in use, and by "gross" I mean the value of structures and lands, and the original cost of the rights of the Spring Valley as I determined it. I have forgotten whose figures I used for the Sacramento River water, and I don't recall who furnished them to me. I considered it in a general way.

10,006 I gave those things consideration only to the extent to feel satisfied that the cost of bringing such supply in, per million gallons, did not exceed the value of structures and lands, and the original cost of water rights of the Spring Valley Water Co. per million gallons. I don't recall at all at this time what was to be the cost of bringing water from that source. I just had information in a general way. I could not state definitely on what route it was to be brought to San Francisco at the present time; I went into the matter several months ago, but I do not recall at the present time. If I recall rightly, I had figures on it, but it was several months ago, and I don't recall the details. I probably discussed it with somebody, but I don't recall at this time. I went into it simply to satisfy myself in the matter, and I did satisfy myself to the extent that I went into it.

10,007 The information which I gathered as a result of this inquiry was to determine that the cost of bringing in large supplies from a distant source per million gallons was less than the cost of lands, structures, and the water right value of the Spring Valley Water Co., as I determined it per million gallons. If I had found the cost to be very much more, I would not have accepted it as the value of the right in question here. I pursued it as one of the elements which I considered. I considered that it did not affect the method by which I was determining the rights, and I did not pursue it very far. I am considering in this case gross water right value, and if I had found it cost more to bring in the larger supply, I would have probably then gone into the matter in more detail. If I recall correctly, it was 30% or 50% less. I cannot shed any light on the subject of how large quantities it was at the present moment.

10,008 I think the cost of bringing water from a distance has no bearing in this particular investigation we are engaged in now in determining the market value of these water rights. I understand the rulings of the courts in the matter of such proceedings as this, the cost of the substitutional supply is not one that is considered. I pursued that subject in order to have some idea in the matter. I wanted to be familiar with all phases of the situation. I probably said that I rejected that because I found the cost to be lower than the value which I had attached to these Spring Valley rights. I gave the matter no consideration at all in the determination of my values for that reason, and this other reason I just stated, that is, that I understood that it would not be permissible to use it in any event.

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When I stated that the value of a right the size of this might be very materially affected by the cost of bringing water from a distance, whereas, the value of a right like that at Livermore would not be necessarily so affected, I had not in mind at that time the value for rate-fixing purpose. What I had in mind was that it was only for the moment in answering your question that I had not thought of the rate-fixing feature of it. When I stated that whereas the value of a large source of supply might be affected by the cost of bringing water from a distance, and that it would not necessarily affect the value of a small supply, I had in mind in connection with the sale of the property as between buyer and seller. When I stated that the ability to obtain a source of supply from a distance might have some effect in ascertaining the market value of an existing supply, I had in mind merely the idea of the market value that might be established between buyer and seller in a sale. As I have said a number of times, there might be a consideration of that sort involved in a matter of sale as distinguished from a rate-fixing proceeding.

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I think that if the matters involved here were a sale of these water rights, that what it would cost to bring water from a distance should be taken into consideration in arriving at the value of these water rights; in the matter of a sale, the point of view of the purchaser, as well as the buyer, is involved. There is an entirely different condition here. I do not think the questions presented here are similar to those that would be involved if there were a buyer and seller considering the purchase and sale of this property. On Map No. 3, Exhibit 189, are set forth the ground water contours on December 9, 1913, when they were at a very low level, almost the lowest level which they ever reached within the history of the pumping operations in the valley. I cannot give the area in acres affected by that pumping. The exact boundaries are somewhat difficult to determine, and it is not susceptible of an exact definition. I have not determined the area in acres.

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Mr. McIntosh: I have some of the data here that Mr. Lee used in getting that figure. It is about 7,950 acres, of which 3,650 approximately are owned by the Spring Valley in this area; the other 4300 acres are in private ownership.

Questioned by Master.

Mr. Lee: The blue line contours on this Map No. 3 are the elevations of the water level in the gravels above sea level, when compared with the elevation of the ground surface above sea level as shown in these very thin black lines which are indicated, particularly among the Spring Valley parcels surrounded by colors, showing the depth to the water plane; that is, the levels shown by the very narrow black line are the levels of the ground, and its level, with respect to the blue line at the point of crossing indicates the depth to the water at that point.

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Then at the M line of wells, the water level on December 9, 1913, by this map, would be indicated to be 25 feet below the ground since the blue line is 300, and the small black contour line is 325; that is a little bit north of it. Other colored lines on this map, such as green and red, indicate the lowering of the water level during certain periods; each of these lines has marked upon it the number of feet that the water has been lowered during that period. The green lines are the lowering during the period from October 11, 1911, to June 12, 1912, and as seen by the map, the greatest lowering occurred just west of Livermore, namely, 20 feet. Still further west the lowering is 10 feet, and still further west towards Pleasanton the lowering is 5 feet, as shown by the excessive green lines.

CROSS EXAMINATION BY MR. MCCUTCHEN.

10,014

I have said that the right of the Spring Valley Water Co. to divert water from its Alameda sources is measured by diversion during the period under consideration, the period from 1907 to 1914, and of course that includes the two dry years 1912 and 1913. I did not select those two years, I used the average of the whole period. The statement which I made on page 2 of my memorandum of valuation is to the effect that the limit of the right of the company to develop sub-surface water at Pleasanton Wells is established by the quantity which can be developed annually without materially lowering the ground water level beneath lands in the upper valley not owned by the company. This limit has been exceeded certainly during 1913, and possibly in other years, but in determining the average dependable yield this fact was not taken into consideration.

Questioned by Master.

10,015

In explanation of the hydrograph I spoke of these two years as critical years; that means that the rainfall and run-off for those two years was very small, and that considering year in and year out the safe yield of the system would be determined by the yield during such years as that. In reservoir studies, for instance, enough water must be stored in years of plenty to hold over the years of drought. In my calculations of the yield of the rights I did not limit it to the amount which was yielded during those dry years. I averaged the yield during the whole period of years, but I did not limit it to those two years, so that the amount that I have used as the yield of the rights is a greater quantity than what would be termed a safe yield; the safe yield being what they would yield in years of dryness such as 1912 and 1913.

CROSS EXAMINATION BY MR. MCCUTCHEN.

Speaking of the Alameda sources, the safe yield would be the yield which the system would produce, or which the company could obtain in the driest years, whereas, the yield as I have determined

it for the purpose of valuation is the average yield, and would be greater than the safe yield. That is true of Pleasanton alone, for the reason that each year under normal conditions the gravels are, to a large extent, replenished, whereas, if the year is very dry, the succeeding year does not fully replenish the gravel, so that the extraction is limited thereby, or if it is not, the water level falls very low.

The yield of the rights, as I have determined it over there, is about 14 million gallons a day. That is the average yield, and that is what I have valued. The value of the land over there per acre which overlies the basin from which the water is pumped varies, depending somewhat on the character of the soil, and other conditions which naturally affect land values. These pumping operations were depriving these lands of something to which the lands were normally and naturally entitled, and I undertook to say what sum would compensate the land owners for that deprivation. If that land were worth \$500 an acre, the deprivation of that right would be greater than in the case of land worth \$10 an acre. In the latter case a man would not be pumping from his land, because on such low value land, there would be no utility in the land. As to whether the right was worth more against land worth \$500 an acre than it would be against land worth only \$100 an acre would depend entirely on what the conditions were. The right in one case would be equivalent in money value to the right in the other case where the water could be used for irrigation purposes on the land. Whether the water would produce more when applied to the \$500 an acre land than when applied to the \$100 an acre land would depend entirely on the conditions that obtained in each case. I know, in a general way, that the soil within the area covered, excepting some instances, will raise crops under cultivation. Generally speaking, through these tracts there the conditions are such that crops can be raised, and the lands are of a generally comparable nature.

Generally speaking, the value of that right to one tract of land affected by the pumping operations is equal to its value on another piece of land affected by those pumping operations with consideration being given to the fact that on some of the lands the water level is not lowered as much as on the others. If I were going in there to take away from these people the right to have maintained the natural water level, I would determine the value of that right, I think, by the way I have pursued.

If I owned \$500 an acre land there, I would feel well paid if I got \$20 an acre for the right of the water company to lower that water plane, if I was assured that that was the extent of the damage which the land had suffered. In the case where the water is very close to the surface there is drainage needed. I did not deduct anything from the damage for that reason, because it was a benefit resulting to the land; a great deal of the land is benefited by the

10,019 pumping operations, but I did not deduct anything from the amount for that reason. You have the full lowering of the water level. The injury to the 4300 acres in private ownership was greater than to the lands owned by the company, but the owners of these lands are not satisfied to allow such damage to occur. The lowering occurred in 1912 and 1913 on the company's lands, and the lands above, as indicated in these maps. My theory is that it did not result in acquiring any right against the lands in private ownership, for the reason that the owners of land in private ownership seriously objected to such lowering, and I understood that the company would not be permitted to lower the plane to that level any more, as against these private owners. I proceeded on the theory that the company would not be permitted to lower the plane any longer as against these private owners. The very fact that their objection was voiced would so indicate. When the company stopped lowering the plane as against these private owners, the plane would come back on its own land, and there would not be any necessity to allow even \$20 an acre. That matter has been taken care of; with regard to the lands, there is a lowering every year beneath the company's lands.

I do not think that eliminates my \$122,000 for water rights on Pleasanton. The lowering which occurs every year affects the lands above the company's land, as well as under the company's land. I have no record of how long that has continued. It has continued as long as the company has been pumping those Pleasanton lands. The lowering is more pronounced at the upper end of the valley than it is down near the pumps, and there has been some lowering beneath those lands each year. I do not think that the lowering on the lands of the private owners, which has been going on for a number of years, was known to the owners, for the reason that it was discovered only in 1913 that there had been a great lowering. I understood that the lowering of the water plane on the lands of these land owners above did not constitute the acquisition of a right.

10,021 The value of the right is the extent of damage to the land resulting from the lowering of the water level by the company's operations. I do not know what the extent of damage that I have computed is on these particular lands, but I certainly am of the opinion that the amount of damage done to these lands, is, as I have determined it, namely, the amount that will be computed by the method I have followed. I found the greatest damage to be against Parcel R-268, above \$52 per acre. The amount, \$52, is obtained by capitalizing the amount, \$3.14, in the next to the last column—Table 4—there is another parcel further down the column, No. 280, where the increased annual cost is stated in the next to the last column as \$3.24, and this capitalized would result in \$54 per acre.

10,024 The next highest in amount is \$47 on Tracts O-268 and 282, and 283, second parcel. The next in order is \$46 on Tract 283 first parcel,

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and 282 third parcel. On S-268 the amount of damage per acre would be a little over \$45, and on U-268 about \$38 per acre, and on O-268 \$47 per acre, and on p-239, Table 4-a, about \$49. Tract n-239 and m-239 are \$55 per acre, and Tract l-239 slightly less than \$50 per acre, and Tract o-239 is \$49 per acre. All of these represent the actual cost to the land owner of lifting water on account of the action of the company in lowering the water plane. In a number of instances out of that he would get the benefit of drainage, but I have not taken that into consideration in fixing the value of these rights. He cannot be benefited by the pumping operations that he would pursue with the money which would be allowed him; his condition would be that which it naturally would be if the water plane was in its normal level. That is the extent of the damage he would suffer in the matter. All of these various inconveniences and costs, such as operating a pumping plant, are taken into consideration and capitalized. The inconvenience imposed upon him in looking after a pumping plant is compensated for by monetary consideration. For his time in looking after the pumping plant, and seeing that it is kept in repair, he is compensated for that in the cost of pumping in which it is allowed. In the notes at the bottom of Table 4 there are 4 stars, and there is stated the basis of the cost determination, namely, based on operating cost of 7 cents per acre-foot, raised one foot, plus fixed charges of 14% on \$8.13; those take care of the expenses in connection with operation.

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10,026

If the land owner wanted to sell that land, a buyer would not be willing to pay as much for it if he had to get water by pumping as he would if he could get it there naturally, and this amount which has been allowed is just that difference.

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There are a great many of these tracts where water did not flow the year around, so that it is not a matter of comparison between a flowing well and having to pump, except in a few instances; the situation there is such that in most instances some pumping would have to be undertaken under natural conditions, and the very fact that prior to the Spring Valley entering into the valley the owners of land there tried every possible means to drain lands, indicates that the existence of artesian pressure was of no benefit to the land. It made the land water-logged and so wet that it was impossible to cultivate it. The lowering of the water table within the artesian area, I think, was a great benefit.

ONE HUNDRED AND THIRTY-SEVENTH HEARING.

APRIL 14, 1916.

Witnesses: CHAS. H. LEE for Defendants.

W. A. BISSELL for Plaintiff.

10,028

Witness: CHAS. H. LEE for Defendants.

Questioned by Master.

The correction in the legend for deduction for pump slippage from 15% to 5% was not necessary in the hydrograph, as the error was not carried into the hydrograph. I know that the computations were made at 5%. It was accidentally written 15% in the legend.

10,029

Questioned by Mr. Greene.

The 5% deduction was made in the record of flow at Belmont pumps in plotting on this hydrograph. As explained on the legend, the Belmont pump record was used where the Brightside weir record was not available, and in such instances the Belmont pump record had applied to it the deduction of 5% for slippage, and then added to that some 600,000 gallons per day for deliveries to users on the cone, and for waste at the Niles Screen Tank, so the attempt, as near as possible, was to get the actual flow in the creek as obtained by the diversion and the waste over the dam. The hydrograph was plotted to obtain as nearly as possible the natural flow of the stream.

10,030

Mr. Herrmann: If the 600,000 gallons includes besides the riparian delivery all the delivery along the pipe line, then assuming that the 5% is correct, that gives the flow in Alameda Creek correctly.

Bissell

Witness: W. A. BISSELL for Plaintiff.

Mr. Bissell: I find that the figure to which the water rights of the Livermore Water Co. was reduced was \$85,000 instead of \$75,000. I was asked yesterday if the Mocho rights appeared separately on the balance sheet; they do not. There is an entry for water rights \$100,000 on the balance sheet. My statement that for the purposes of the sale the water rights were assumed to be a trifle less than a million gallons a day still stands.

Questioned by Mr. Searls.

10,031

We sold all the water rights under this 377 acre ranch. We called the total water rights a million gallons, and thought that it was. The only test we ever made showed that it was about 900,000 gallons; we ran for thirty days and pumped 27 million gallons of water. There was a great difference of opinion as to whether it might be possible for the purchasers of those rights to drive another well and pump still more water.

Questioned by Master.

The Livermore Ranch was exploited a long while ago for the extent of its gravels and its water development. The gravels there are quite shallow, but there is a good bed of gravel. It was after I took possession of the company that we put down this big sump and got this big flow of water. There would be no objection to the purchasers of the water rights putting down another well and pumping all that they could get there, as they have the rights to all the water on that ranch that they can get by sinking a well or wells on the three or four acres I have spoken of.

Questioned by Master.

We could not go out on the ranch and put down a well anywhere, but it was assumed that by properly placing our wells on the little piece of land we owned there that we could get the entire flow of that gravel bed, and I don't think there was any doubt of it. We had 12 or 13 wells there, and then we put down this big one, which was 12 feet in diameter; the others had been 8 feet. The space we had in fee there was pretty well covered with wells. The contour of the country is such that there was a high bank on one side, and it was believed that the old stream that we were tapping was forced by that range of hills to run through that narrow gap there. I should not have considered that it would have paid to put down wells at any other place on the ranch, even if we had the right. 10,031½

Witness: CHAS. H. LEE for Defendants.

Lee

CROSS EXAMINATION BY MR. McCUTCHEN.

10,032

Before I fixed the value of the right as against these lands to lower the water plane, I examined the valuations of these lands as made by the city real estate appraisers. I don't recall that I asked for any information regarding the opinions of other real estate experts. I looked at the records of the original cost of the lands. I did not go into the detail of the land values on this side of the bay in determining the value of water rights. I do not recall in the detail the value relative to these various tracts.

Assuming that Mr. Parson's valuation for Parcel 283 was \$300 an acre, and his valuation of Parcel Q-268 immediately south of it was \$400 an acre, I still think it was quite proper to say that the value of the right against 283 to lower the water table was \$49 an acre, and the right to lower it as against Q-268 was only \$10 an acre, because the damage to the two tracts is of a different magnitude, and the extent of the lowering is of a different magnitude with the two tracts. I did not find that it would be a benefit to Q-268 to have the water plane lowered; that tract, as I recall it, is not within an area that was 10,033

too moist for possible cultivation. I think it is accurate to say that it would be right to deprive that land worth \$400 an acre of its normal water table for about one-fifth of the price that should be paid for the same right, as against Tract 283 immediately above it, worth only \$300 an acre, as the damage in the two cases is different. The right is worth more per acre in the one case than in the other, as in the one case the damage to the land is greater than it is in the other.

10,034 It is a fact, assuming that basin were filled, that when you began to draw upon the supply within the basin, you would immediately begin to affect both of those tracts, but in different degrees. Taken as an average, the Tract 283 might be deprived of flow during some period of the year, assuming that the artesian pressure was sufficiently great there to cause flow, which I have done. Whereas, on Tract 268 the elevation of the land was such, and the artesian pressure was such, that in my judgment the water as obtained in wells, would not have flowed. That is the principal element of difference in the two cases. In the case of Parcel 283 it might have been necessary to install a pump upon wells subsequently to the Spring Valley operations, whereas, on Q-268 it would not have been so necessary. My method was to determine the right on the basis of the damage similar to the manner in which the company has acquired or proposes to acquire rights on the lands above which they do not now own. As for the consideration of the value of the rights as acquired, I took into consideration the fact that the total amount of some \$122,000 as compared with the quantity which the company developed on the average, some 6 million or 7 million gallons per day average during the past few years, that the amount per million gallons is obtained by dividing \$122,000 by seven, which is in the neighborhood of \$17,000 per million gallons, considerably in excess of the value of rights in that locality, namely \$8,000 per million gallons per day as I determined it. In that way I compared the amount of the damage computed per million gallons against the value of rights in the community, and ascertained that it was considerably in excess of that value. That is, the value of rights for local uses in the community.

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If the company had been presented with all those rights, I still think that would be a very reasonable way to determine their value, and would be the limit of their value, even in that case. In my judgment, no water right in the locality where these waters are gathered would be sold for more than \$8,000 per million gallons per day for the general uses in the locality. I am not definitely informed as to the use the Livermore Water Co.'s water was put to, but I understand it was for a local community, whereas I am considering the general uses of water in the locality.

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I take for granted, from Mr. Bissell's testimony, that there was a sale of that water right. I know of no specific sale of water rights

in that community for any use, but I know that no local land owner would pay anything more for water rights than the cost to him of developing a supply on his land. No land owner would have paid Mr. Bissell's company for water any more than it cost him to develop water on his own land. A study of the cost of developing water from these lands would throw light upon the problem. Whether the same method would indicate lack of business prudence and foresight on the part of the Pacific Gas & Electric Co. in paying Mr. Bissell for that water right any such price as it did, would depend entirely on the point of use, the place of use for which the company desired to use the water, and the local demand and supply, and the distance that they were from the portion of the valley where water underlies all of the land. I am not fully informed as to the conditions which surrounded this Livermore purchase, and the use of water by the Pacific Gas & Electric Co. The water contours extend over the town of Livermore, but the formation becomes broken at that point. The fact that the contours extend there shows nothing with reference to the possibility of developing water there. Even in the hardest and most dense rock there is water, but that indicates nothing with reference to the possibility of obtaining water from the formation.

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In determining the effect of pumping operations on lands around and near Livermore, I have made some examination of the logs of wells that were available, covering a considerable portion of that country, and I have assumed that the material in the valley west of Livermore, and beyond to Pleasanton, was open gravel, and just above Pleasanton there would be clay, and surrounding the valley the hill formations are more or less dense, and in some instances, shales and denser rocks. In the vicinity of Livermore there are local formations which are not uniform. The formation running down just to the west of Livermore is more dense than the valley on down toward Pleasanton. I have not any detail geological information concerning the formation surrounding Livermore Valley, but I recall seeing shales in that general country, although I do not remember any specific instance. To the west of Livermore on down to the valley, where the gravels are open and porous, the formation is such that water may be derived therefrom by pumping. In the immediate vicinity of Livermore there may be small basins where water could be developed. The Mocho flows within a quarter or half a mile to the south and southwest of Livermore. It does not flow through the town.

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The well records indicate that during the period of greatest lowering that the water plane was drawn down to some extent in the vicinity of Livermore, but nowhere near as much as to the west, but it was drawn down slightly. The formation is tighter in the vicinity of Livermore, and the water level is held up very much higher than just to the west, due to this tightness. On map 3, the lines of equal lower-

10,040 ing between the dates October 21, 1911, and March 22, 1913, indicate
a lowering of 10 feet in the north part of the town. Taking the con-
10,041 tour 440, Map 1, there is a slight lowering shown there. I put in the
contours 480 to 460 as representing my best judgment as to the posi-
10,042 tion and the level of the water plane on the dates shown, but I had
much more complete data to base them upon in the region west of
Livermore than right at that point in Livermore. The difference of
20 feet there is my best judgment from the examination of the rec-
ords, as shown by this map, but I had not as complete material to base
that judgment on in that locality as to the west. Considering the fact
that the formation is not open at Livermore, and that large yields of
water cannot be obtained locally in that vicinity, but merely the yields
as obtained from domestic wells, the lowering would not be anywhere
near as great in magnitude foot for foot. The fact that the lowering is
a great many feet less than it is to the west would still more greatly in-
crease the difference in the magnitude. The effect of these pumping
operations on those lands could not be called almost negligible, but it
10,043 is very inconsiderable as compared with the lowering to the west in its
effect on the lands. Considering the conditions right at that point,
certainly the lowering is of considerable moment to the owner of that
land, but to what degree that lowering is due to the operations of the
Spring Valley pumping is a point I have not examined into. The
lowering of the water plane in the valley is not due entirely to the
company's operations. That is true of all these contours that I have
put upon this map. The doubt to what extent the lowering of the
water plane is due to the operations of the Spring Valley Water Co.
I have eliminated in my computations with reference to the lands of
the company, but I have not gone into such a study with reference to
the lands at Livermore. If you had followed the method I had worked
out here, you would see that I have eliminated any element of lowering
which may be due to other causes than the company's own operations
in the computations of the damage to the lands of the company, but
I have not gone into such a study on the lands above.

10,044 I have not the exact boundaries of the tight country delineated on
the maps, nor have I it definitely in mind. I have not seen any map
of the geological survey, giving the boundaries of that tight country,
but I have seen a map which was prepared in connection with a study
which was made in the valley a number of years ago, and which de-
lineates that to a certain extent. My investigation of the fluctuations
of water in the wells, as shown by these contours, indicated in a gen-
eral way checking up this map to which I have referred. I have also
examined the ground in a general way on the surface, and observed
that with reference to the same facts.

I think the time I crossed the Mocho near Livermore the bed of the
stream was dry, and I do not know whether there was any water flow-

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ing in the stream above that point at that time. In the winter-time I understand that water flows in the bed of that stream. After it gets to the town of Livermore, it passes on down the stream, and a large portion of it passes on down through the valley, eventually finding its outlet into Alameda Creek, through Laguna Creek, as flood water. A portion is absorbed by the gravels. The portions absorbed by the open gravels to the west of Livermore are greater than that which is absorbed in the region of the tighter formation, although there may be small basins along there. I have not gone into the detail of that. 10,045

Questioned by Master.

The lowering, as I see it, was due to the combined effect of pumping at the west, and the deficiency of water in the Mocho during the winter of 1911-12. That was a very dry year, and the amount of water which was brought down by the Mocho and the Arroyo Valle during that winter was very small. It is the combined result of a draught by the Spring Valley Co., and other drafts and evaporation, and the absence of inflow during the winter to wipe out the lowering of the preceding winter and fall. I do not conclude that if there had been no pumping at the west, and only a minimum amount flowed in the Mocho during that winter, that the water level would not have changed; there would have been some lowering, due to the fact that water is lost by evaporation from the lower part of the valley under natural conditions. The artesian pressure causes the water to sweat through the clay cap which covers the lower part of the valley, and to leak through openings in the clay, and this results all summer long, under natural conditions, in forming a lagoon and a large area of wet land in the lower part of the valley, from which evaporation is carried, and thus naturally some lowering would have occurred in the upper end of the valley, regardless of any artificial extraction of water. 10,046

CROSS EXAMINATION BY MR. MCCUTCHEN.

Without a knowledge of the detailed conditions, it is not easy to say offhand whether the need of consumers in Livermore for the sole supply was any greater than the need of consumers in San Francisco for the Spring Valley supply, but generally speaking I should say that the demand would be about equal. From my limited knowledge of the conditions with respect to the supply of domestic water at Livermore, I should say that the demand at Livermore was no greater than at San Francisco. In order to say whether it was as great for that particular water as the need of San Francisco is for this particular water, I would have to know the population of Livermore and the quantity represented by this water, and the population of San Francisco, and other matters of that sort. The supply of the Spring Valley Water Co. at present is not much more than adequate to the demand. Assuming that the Bissell supply is the only supply available for gen- 10,047 10,048

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eral municipal uses, I should think the demand for the Bissell supply might be comparable with that of the Spring Valley supply for San Francisco on the assumption, of course, that the population there, and the uses are such, that the demand would be as much as the supply by the Bissell plant. What I had in mind in the preparation of this Map No. 1 was the computation of this damage due to the lowering of the water resulting from the Spring Valley Water Co.'s operations. My information with conditions over there is sufficient to know that at the town of Livermore the gravels are not as open as they are further to the west, and that the ease with which the water may be developed from the gravels is not as great as further down the valley to the west. I am considering the valley in general when I say "further to the west", from the vicinity of the Arroyo Valle to the northward and west.

Whether the water rights which the Spring Valley has are worth as much per million gallons for the purpose for which they are used as the Bissell right is per million gallons for the purpose for which it is used would be entirely a matter of whether the net value of the water right was considered or the gross value. The cost of the development of rights is the important element to be considered; the Spring Valley development with respect to its cost of lands and structures and so on, and the supply from this Bissell property, when the cost of development there is considered, it might be an entirely different proposition.

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Questioned by Master.

As I recall Mr. Bissell's testimony, it was that the figures that he gave were for net water right value. That is, that it was an amount paid over and above the cost of structures. If I assumed that that was the fact, I would not necessarily have a basis of comparison between the Spring Valley and the Bissell water rights on the net water right values, for the reason that the cost of the development in the two cases must be on a par. If the cost of development in the two cases is on a par, then there would be a basis of comparison equally per million gallons. It might be a great deal cheaper to get the water at Livermore than at the Spring Valley system. One might require an investment of \$1,000 in lands, and the other of \$100,000 in lands.

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CROSS EXAMINATION BY MR. MCCUTCHEN.

Considered as gross water right value, and assuming that the possibility of getting other supplies was comparable with that in San Francisco, then it may be considered that the value to the user would be equal in the Spring Valley and Livermore cases, assuming that the relation of the supply and demand was the same. The cost of pumping would be one element to consider in the determination of the net water right value. I still think that the sale value per million gallons, con-

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sidering the community over there as a whole, and not the little town of Livermore, is worth \$8,000 per million gallons, because that is its sale value in the community. Referring to this Bissell sale, I refuse to give it any weight, because I consider that a small amount of water of this sort in this specific instance does not set any general market value in the community, and that the net value must be determined with respect to the Spring Valley supply in connection with the cost of development. I gave it this consideration that it is a supply near the point of use, and the development expenses are small compared with the very heavy expenditure necessary for the development of the Spring Valley sources in the bringing of the supply to San Francisco.

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The relative expense of supplying a large community with water, and supplying a small community with water, depends entirely on local conditions. Whether the expense per capita increases with increased population depends entirely on the local conditions. I did not give this Bissell sale any consideration in arriving at the market value per million gallons of the water produced from the Spring Valley system in Alameda County, and I don't think it is entitled to any. I am not informed in detail as to the conditions at Livermore sufficiently to state definitely as to whether the water right which the Spring Valley Co. has is worth as much gross per million gallons as the water right which the Bissell Company had, and which it sold to the Pacific Gas & Electric Co. I don't think that the Livermore right and the Spring Valley right are comparable at all, and I have not sufficient information to state whether the Livermore right per million gallons might be of a much greater market value than the Spring Valley right per million gallons. I understand in a general way, from the discussion, that the Livermore water is used for the identical purpose for which the Spring Valley water is used, but I am not fully informed as to the exact use of that water at Livermore.

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If I had found that the Bissell right was used for irrigation, and that for that purpose it was worth \$8,000 per million gallons, so far as it was an indication of the market value of water rights in the community, I would have taken it into consideration in determining the market value of the Spring Valley rights. I would not have seized upon the Bissell sale, with avidity, had it been \$8,000 for irrigation purposes; it would have confirmed my other information.

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I went no further afield to determine the value for irrigation purposes of the right to use water to grow crops similar to crops that are grown in the locality where this water is gathered than Mr. Herrmann and Mr. Anderson did in their endeavors. I followed them until I found that I could not follow them to the end.

I gathered information of this sort and ascertained the value of water used in citrus culture near those communities where oranges

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were raised, and that was not the least valuable of the uses to which water was put in the community. You understand that in each case the gross value was determined, and that then the gross value for conditions most similar to those in Alameda Creek was used, and from that was deducted the local cost of development for an assumed irrigation on Niles Cone, resulting in the \$8,000, so that I found no \$8,000 in any specific instance; it would vary depending on the low cost of development. Taking everything into consideration, \$8,000 in the locality of the Spring Valley Water Co.'s property would represent the highest value of the water right in use locally, in uses other than that to which the company puts its supply. I found that for other crops which could be grown under entirely other conditions than alfalfa and citrus trees were grown, it would have a greater value than this other use, the specific use being citrus culture, for the reason that the profits derived from such use were greater. I understand the Bissell water was being used for domestic supply, but the Spring Valley and the Bissell water as to the two quantities of water are not comparable at all. There are considerable volumes of water available in the various systems I considered.

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To compare the two quantities of water—Spring Valley and Bissell—is very much like trying to determine the value of a thousand-acre tract by the sale of a two-acre tract. What I mean is that a body of land in a small tract—2 acres—involves an entirely different situation with respect to its uses and usefulness than the large tract, and would be considered in an entirely different manner.

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Assuming that there was a water right in one case that yielded 34 million gallons per day, and a water right in the other case that yielded a million gallons per day, and that they were used for the same purpose, and that there was a demand for all the water in both cases, it would be necessary in addition, in order to make a comparison, to consider the cost of developing the supply in each case, the relative cost. If there had been a dozen sales of the same relative quantities in the immediately vicinity at the price paid for the Bissell right, I might have investigated the matter. I did not consider the Bissell sale, and I refuse to consider it now. In the course of my investigation I found that several years ago the Spring Valley Water Co. purchased quite an area of lands around Pleasanton. I understood in a general way that just prior to that there was litigation that was pending against it for the purpose of preventing the company from withdrawing water from those lands. The import of the information which I had, caused me to assume that that was one reason for the acquisition of these lands. I assumed that the water which the company was withdrawing from that source at that time was needed for San Francisco, otherwise, the company would not have been developing it. My lack of familiarity with the situation at that time does not go to my ability to express an opinion as to

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the advisability of the company owning the lands now. I see no reason why the company could not dispose now of those lands at a figure which would not result in any less compensation to the company than the expense of the damage to the land, as I have determined, particularly in view of the fact that it is probable that land values have increased in the locality: I am not specifically informed as to that, but it is probable. Based on what information I have, the acquisition of those lands might have been a desirable procedure, but I do not regard the lands as being necessary to the continued use and development of the water at the Pleasanton Wells, for the reason that its utility for other purposes is not destroyed, and the land could be sold subject to the right to pump; the damage, as I have estimated it, would be what I consider at the most the difference in amount which might be involved in the transaction. I do not want to be understood as saying flatly that I think the purchase of that land by the company at the time it was purchased was a prudent act, looked at from the standpoint of the company as a water supply company, for the reason that I do not know all of the conditions which obtained at that time. The acquisition of those lands may have been a matter of good judgment on the part of the company. These lands are agricultural lands, and their agricultural utility is not destroyed by the operation of these pumps, and there is no reason that I can see for the continued ownership of the lands. In making that answer I take into consideration that the lands probably have value for reservoir purposes. I have considered that the market value of these lands for all purposes to which they may be put includes this value of an underground reservoir. I consider that by the position of the land with respect to the water-bearing gravels beneath, the land has an element of value which is included in its market value, the general market value of that land in the community. What I mean is the amount at which that land is valued includes any value which it has by reason of the water which underlies it in the gravels, as ascertained by the sales of similar land in the vicinity which is similarly situated. I consider that no more value attaches to that land because there are reservoir capabilities than is reflected in the market value of lands in the locality similarly situated. I consider these lands are no more valuable, being available for agricultural purposes, and also having reservoir capabilities than if they were simply valuable for agricultural purposes alone. I consider that their storage capacity is of no more value than is indicated by the general market value of these lands, for the reason that the lands can be bought and sold at its general market value for all purposes. The lands in the Livermore Valley overlying the gravels are bought and sold for the general market price in the vicinity for all purposes to which they can be put. I do not consider that those lands have any more value for storage than is reflected in the general market

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10,065 value for all purposes to which they may be put. Their market value attaches to them for all of the uses to which the land may be put.

I think there is in the market value a specific value which is attributable to its storage element, but the exact amount would be very difficult to state. Considering the great need for water in this locality, and considering the source of supply available to this locality, it is not my opinion that that land, for its storage capacity, is worth more than it is for any other purpose. The fact that that

10,066 water is stored there, and can be availed of in any season of the year, does not render the storage element of more value than that land has for any other purpose. The storage element is not comparable in value to the value of the land for any other purpose. That storage enables the company to draw upon the water when it needs it, and to hold the water to a certain extent in reserve when it does not need it, and I have taken that into consideration in determining the value of the company's rights as to these lands by a consideration of the extent to which the lands could be damaged by the use of this storage capacity by the company. My value of \$122,000 covers the reservoir value; in the case of a surface reservoir, the land is not available for other uses, because it is flooded, but in the case of the underground reservoir it is available for other uses. The amount

10,067 of the damage, \$122,000, represents the extent to which the value of the land is injured or the land is withheld from use by the development of ground water by the company by the storage gravels. I regarded that \$122,000 as including that portion of the cost of the land which could be ascribable to the value of the water right, and the use of the land for reservoir purposes under the original cost method. I consider that that generally covered the reservoir value, as I regard the amount I ascertained as the value as being in excess of the value for the water right and the reservoir feature. I consider that the damage to the land includes both the storage value and the water right value.

10,068 I regard \$22 an acre on the average as covering the element of value for water right and storage. The advantage of owning that land, as compared with its ownership in someone else, considering the water right and the right of storage, is only, in my opinion, worth \$22 per acre, and I assumed that not to exceed 7 million gallons per day at present could be obtained from this source. That number of gallons at \$122,000 would be slightly more than \$17,000 per million gallons.

10,069 On the Peninsula the element of value, in connection with storage is included in various elements—lands, structures, and water rights acquired below the point of diversion. In the case of the development of the Pleasanton storage, the lands above the pumping sites are not necessary to the development of the storage. The

10,070 lands can be disposed of and used. The storage then would be un-

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derneath the ground, as it is at present. The exclusive ownership in the entire land there is not necessary. In order to get the 7 million gallons a day on the Pleasanton rights, I would spend the amount necessary to acquire the pumping site and wells. That is not \$122,000; the other amounts are included in the land appraisal and the structural appraisal of the properties. I assumed that the pump tracts would be included in the valuation.

The value of the Bissell right might depend on the net value. To say whether the Bissell right was worth \$85,000, aside from the structures necessary to avail of its use, while this right to take about 7 million gallons a day is worth only about \$122,000, it seems to me is not susceptible of an answer without consideration of the gross value of the rights in use. I cannot make a statement as to whether those two things are consistent without knowledge of the gross value of the rights in use, and the expense necessary to the development. 10,071

Referring to Mr. Bissell's statement that that water right sold for \$85,000, and that it was slightly less than a million gallons in quantity, apparently, from all I can understand, the matter is not definite; there might be other wells put down, and other water obtained. I think the adoption of the figure of \$8,000 per million gallons of water a day for irrigation in that vicinity is an over-estimate. I think that will apply to the Niles Cone where gravity water is available, but its use there, and in speaking of it there, it was in a tentative way only that I used it. I have not a value to the company's water rights on the Alameda side in such a way that it can be separated from the system as a whole. The gross value of water rights in that community there on the Alameda Creek I consider is not in excess of \$15,000 per million gallons per day. That is what I consider the gross market value of rights in that locality for the uses to which it may be put, other than the use to which they are being put by the company. I have not adopted its value for the purpose for which it is being used. Its value for that purpose is the original cost of acquiring the rights separate from the lands and structures. I am unable to segregate the original cost with respect to the Alameda source. 10,072 10,073

There is a great demand for water in the bay cities. It might fairly be said that there is a shortage of water on the easterly side of the bay, and the City of San Francisco is certainly in need of water. Water is needed all up and down the Peninsula. 10,074

Whether the right to take 7 million gallons a day would be worth \$1,220,000 I cannot give consideration to at this time, not having all the information available. I would require the various elements of cost involved. I have not said that the water rights over there taken as a whole are worth \$54,000 per million gallons; I have considered the property as a whole over and above the value of the lands and structures. I cannot state whether those rights 10,075 10,076

on the Alameda side of the bay, taken as a whole, are worth \$54,000 per million gallons of daily supply. If it were possible to make a segregation of the value I assigned to the company's water rights as a whole, it might be possible for me to express whether I had a doubt about it or not.

10,077 I think it is impossible by any method which would adequately and fairly represent the value of the water rights over and above the lands and structures to consider the rights in Alameda County separate from the rights in San Mateo County.

10,078 Mr. Searls: The figure \$122,000 represents the right as against the Pleasanton lands, and it entitles the company to pump at Pleasanton. If there is a portion of that water that used to flow down the creek, and the Niles Cone owners have any say in it, it does not entitle the company to take that portion of the water.

CROSS EXAMINATION BY MR. MCCUTCHEN.

10,079 Mr. Lee: The \$122,000 represents the value of the right to take that 7 million gallons per day; also there are other elements to be included, the lands against which rights to develop water at Pleasanton Wells have been obtained by purchase—the Grant Gravel Co., and the Scrivner property. With respect to any waters which would have flowed down Laguna Creek and on down to Alameda Creek, if there were such outside of the flood period, there would be a proportion of the amounts paid the riparian owners on Niles Cone. If this water were pumped from the reservoir after the surface flow ceased, the right would not then be affected at all by riparian rights below. It would be impossible to state definitely just what amount of the 7 million gallons a day which is developed at Pleasanton is removed from the flow of the stream further down. The extent of the water that might go down the creek is not much, and is now developed by the company, so that for practical purposes the right to take the 7 million gallons per day is worth the aggregate of the cost of pumping water on the lands owned by the company, and no more. The portion that can be distinctly ascribable to the Niles Cone is not large. The whole difficulty here is that it is impossible to segregate the Livermore supply from the Peninsula system in this method which I have used. Considering the sum total as arrived at by the original cost method, as compared with the valuation as made by the market value method, there is no element of unreasonableness involved. It is impossible, though, to split up and segregate into different sources by the original cost method, and to come to any conclusion that enlightens one. In some instances the cost of any one of these rights by itself would throw light on the question of its value. For instance, take the San Mateo stream; as I understand Mr. Herrmann's testimony, the amount of water which was diverted by the company as the result of the purchase of riparian rights on the

10,080

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lower stream was some $4\frac{1}{2}$ million gallons. I don't agree with Mr. Herrmann on that, but I am taking this to indicate how one portion of the system might be considered. 10,081

Assuming that the acquisition of riparian rights below the Crystal Springs Dam did allow the company to divert $4\frac{1}{2}$ million gallons, the cost of acquiring these rights, as I have ascertained it, is about \$187,800; dividing this by the amount of $4\frac{1}{2}$ million gallons, there results \$41,700 per million gallons per day, which, as applied to the yield of all the rights of the company would result in the amount of \$1,490,000 as of date 1913, or any date subsequent to the purchase. In that particular instance I think it may be considered that immediately after the purchase that that was the value of the rights. This amount of \$187,000, as I have computed it, includes everything. 10,082

My statement that the right to divert water was a right in realty referred to a flowing public stream, a stream flowing through a number of properties. I think that the riparian right with respect to those lands below Crystal Springs Dam would not have enhanced in value even if the real estate to which the right was riparian had advanced in value, because its utility has not increased. I think the value of the riparian right is to be determined from its utility to the owner of the riparian land. Some of the land on San Mateo Creek is used for town lots, and upstream other land is used for country estates, and considerable of it is narrow canyon that is not available for much of any use. A flowing stream there would add very little to the scenic beauty of that country. If I owned land there I think I would desire very much to have the condition with respect to the flood water alleviated as has been done by the storage of water above. I would not be glad to give the right away, as the right is of some value. The flood flow continues for only three or four months of the year, and during the other months of the year the flow does not continue. I don't understand that the company got the right to that flood flow by the purchase of these riparian rights; as I understand it, the flood flow is not a part of the right of the riparian owner. I do understand that the flood flow had to be utilized to make up Mr. Herrmann's average of $4\frac{1}{2}$ million gallons a day. 10,084

The \$187,000 considered per million gallons I do not think was the fair market value of the rights acquired by that purchase at the date of the purchase. In the first place, the water was not being used by the riparian owners in any manner, or to any extent, so that they were in the position of knowing what it was worth to them from the return that they were getting from the use of the water. It was not in the mind of the riparian owner in any sense of the word a sale of so much water per million gallons; it merely represented his idea of what he might be able to obtain, and in most instances this was on the basis of the front foot. The \$187,000 did 10,085

not represent the riparian owner's knowledge of the value per million gallons. I named this particular purchase as coming within the category where the purchase price fairly represents the market value of the thing purchased.

10,087 There were certain lands in Owens River Valley that were acquired which overlie subterranean gravels containing water from which it was proposed to develop water for the supply of the aqueduct. Those lands were not regarded as being of any more value than other lands. Some of those lands were acquired by the City from Congress, upon the ground that they were reservoir lands, and that was done under my recommendation. They were sought because they performed the same office as the Pleasanton lands of the company. That is, for the reason that they lay above the water-bearing gravels. Those lands which overlie a subterranean reservoir did not include all of the lands under which that reservoir extended. The other lands were purchased from private parties. The matter of sale of these lands in Owens Valley overlying the artesian basin has been considered, and it is proposed at some time to dispose of these lands with the pumping privileges reserved. They have owned some of these lands for 7 or 8 years. The matter of the disposal has been considered, and is regarded as a desirable thing to do at such time as the land has attained a value so that it can be sold without loss. It could be done, now as the lands have increased very much in value. The reason they have not been sold, as I understand it is that the Board of Water Commissioners have been so occupied with other matters that they have not given that matter the final and definite attention that it needs. I think it is Mr. Mulholland's opinion, among others, that it is not necessary to keep these lands.

10,088

10,089 I know of no instance in this state where riparian rights are considered of less value today than they were in 1888. In districts where the flow of the stream adjoining the lands is of sufficient volume to be used for irrigation purposes throughout the year, there has been an increase in the value of the right which may be considered as commensurate with the value of the land. The water right values have advanced as rapidly as land values on streams where the water flowing in the stream is of sufficient quantity the year around to be available to the riparian lands for uses on these lands. Such, for instance, as on the San Joaquin River.

10,090 In connection with irrigation the question of whether the market value of the right to avail of water for purposes for which it may be used has increased as rapidly in every locality in this state as the market value of the lands in that locality has increased, depends entirely upon the profit which could be obtained from the use of the water and the crops which can be grown in the locality. If this profit has increased in recent years, then the value of the water in use on those lands would be greater, but if it has decreased, it would be

less. What I meant was this: That the value of the water right from year to year in use in irrigation in a locality would depend on the profit to be derived from the use of that water right in raising the crops in the locality. The water right and the land would go forward or go back together for irrigation purposes. The same thing that would make the market value of the water less would make the market value of the land less, and in that way making the market value of the land greater would make the market value of the water greater. The use I assumed was irrigation. 10,091

Questioned by Master.

In regard to a domestic use, I did not have that in mind in my statement, for the reason that the sales of water rights for domestic purposes are not available as a basis for our judgment. We have sales of water rights for irrigation, and can judge from those that the value of the water right in use on these lands would vary somewhat with the value of the land upon which the water was used.

RE-DIRECT EXAMINATION BY MR. SEARLS.

If I should consider only the value of the summer flow in determining the price per million gallons of riparian rights acquired under the San Mateo Creek purchases, for a fair comparison it would also be necessary, in order to be consistent in determining my gross value of the water rights of the system, to multiply not by the gross yield of these rights, but by the sum of the normal flow of all the streams. The normal flow of these streams, particularly on the Peninsula, is considerably smaller than the amount developed by the company, so that without knowing exactly what that is, it is entirely possible that it would bring the total value of their rights within my figure. With respect to the Pleasanton acquisition, if instead of buying the land, the company had condemned the water rights to the extent that they now own them, I think they would be in the same identical position that they are in with respect to the right to draw water from those lands. The amount of damage to the lands under such a procedure would be the basis for a payment. My valuation only goes as to the lands which the company owns. There are additional lands which the company, as I am informed, is now negotiating to obtain the rights for. 10,095

If the owners of lands to the east of the Pleasanton lands of the Spring Valley Water Co. should in the exercise of their ownership of the fee of that property construct a trench and fill it up solid with concrete to the height of the surface of the land, the storage rights in the portion of the Livermore Valley which the company owns, irrespective of the water rights, would have practically no value, for the reason that the water could not be gotten into the gravels. It would be like owning a portion of Crystal Springs Reservoir below any tributary. 10,096

10,097 If the city real estate appraisers appraised these Peninsula lands at their market value, that is the price which any person, including the Spring Valley Water Co., could buy the land for on the date of the appraisal, December 31, 1913, and having bought them, could put them to any use to which they desired to put them, I do not think then that special value should be allowed over and above the value of the land as determined in this manner. The value of the land for water producing purposes would be an alternative use; the land is actually bought and sold at its general market value for all purposes to which it may be put, and there is no special value attached to these lands in actual instances of sale because of water producing ability.

10,098 I am referring to lands within the area above the point of diversion on the Peninsula sources.

My understanding of what the real estate appraisers did was that they valued the land for all purposes to which it might be put, or was useful, including its water producing ability.

10,099 I do not regard the adoption of citrus crops as having any comparability at all to the rights of the Spring Valley Water Co., for the reason that the raising of citrus crops is not a possibility at all in the locality here. It would be an absolute impossibility for the water rights of the Spring Valley Water Co. to be sold for the purpose of irrigating citrus lands, because citrus culture is not possible in the locality in which the rights of the Spring Valley Water Co. could be used. I am speaking of the commercial raising of oranges.

10,100 My statement yesterday that water for domestic uses was seven times as valuable as water for irrigation uses was based on the calculation of dividing \$54,000 per million gallons by \$8,000, and it represented merely a computation, and not the ratio between the value of water in use in irrigation and for domestic use. The factor has very little significance in my mind, except that it shows the ratio of the market value of water for use in irrigation in the locality, and the value of the rights of the Spring Valley Water Co. over and above, and in addition to lands and structures as I have determined it by the original cost method. My estimate of the damage to the Pleasanton lands from pumping included the services necessary to oversee the pumping plants in the item of 7 cents per acre-foot raised one foot. This value which I obtained from the Government Reports includes the item of attendance, and this is the element of time and trouble involved on the part of the owner in connection with the operation of the plant.

10,101 Questioned by Master.

As I understand the basic data, it assumed that if he himself attended to the pump, an amount was included for his time on the basis of the time of a man whom he might employ. It included the attendant's time. The owner's time would be involved in either of them on the basis which I have calculated, either before or after the

installation of the Spring Valley pumping plant. His time would be involved in either event on all of the areas under consideration; in other words, it is a difference which is being considered, the increase in cost rather than the absolute cost.

RE-CROSS EXAMINATION BY MR. MCCUTCHEN.

I stated the other day that the real estate experts for the City had no knowledge, whatever, of the value of property for its ability to yield water considered as a special element of value, but I regard the valuation as determined by the real estate appraisers, namely, its value for all purposes to which the land might be put, as including value which attaches to the land because of its having the natural rainfall upon it, or any other natural feature connected with the land. I think that the ordinary market value of land for all purposes to which it is put includes the rights of the use of the water which fall upon the land, as well as the right to cut trees upon the land, or to use the land for agricultural or other purposes. I do not consider that any piece of land under the conditions on the Peninsula could be more valuable, considered for its water yield than for any other purpose. In a very extreme case it is possible that land might be very much more valuable for its ability to yield water than for any other purpose for which it might be used, but not under the conditions on the Peninsula. If I had talked with a man who disclaimed any ability whatever to tell the value of land for water producing purposes, I would say that his valuation would necessarily include this value for water production if his value was the value of the land for all purposes to which it can be put. In his determination of the market value, he would take into consideration its value for water production, whether he knew anything about it or not.

10,102

10,103

ONE HUNDRED AND THIRTY-EIGHTH HEARING.

APRIL 17, 1916.

Witnesses: JOHN T. MARTIN for Defendants.

LEONARD METCALF for Plaintiff.

(Counsel for Plaintiff advised Counsel for Defendants that he had satisfied himself of the fact that Mr. Higgins is dead, therefore that obstacle in the way of the introduction of Mr. Higgins' testimony in the 1903 cases was out of the way.)

10,104

Witness: JOHN T. MARTIN for Defendants.

10,105

DIRECT EXAMINATION BY MR. SEARLS.

Martin

I am 60 years of age, and reside in Los Angeles. I am right of way and land agent for the City of Los Angeles, working under the

Board of Public Service Commission, and have held that position since February, 1908, but not under the same Board all the time. I started to work under the Board of Public Works which had charge of the construction of the Los Angeles Aqueduct, and when that was completed it was turned over to the Water Department, and I was transferred with it. That was something over two years ago. The general character of my work has been negotiating with property owners for purchasing lands desired by the Board for which I was working. I acquired all the rights of way for the Los Angeles Aqueduct since February, 1908, and that work took me all through the San Fernando Valley, and through and to the northern boundary of Los Angeles County. The County of Los Angeles purchased the Franklin Reservoir site, the San Fernando Reservoir site, the Dry Canyon Reservoir site, and the Fairmont Reservoir site, all in Los Angeles County.

10,106

The Dry Canyon Reservoir site and the Fairmont Reservoir site I purchased, while the San Fernando and Franklin Canyon Reservoir sites were purchased by the Board of Public Works, and the Board of Public Service. In the course of my work I acquired familiarity with land values in the vicinity of San Fernando Valley by discussing the matter with the property owners, and by going on the land, and by sales that were made, and options that were taken. I have bought, personally, land all over the San Fernando Valley since 1908, and in 1908 and 1909 I was in that vicinity negotiating for rights of way.

10,107

I purchased the Dry Canyon Reservoir myself, and acquired familiarity with the value of land similar to that within that reservoir and in that vicinity, as of the date of purchase, part of it in 1908 and 1909. I acquired familiarity with those land values by negotiating with the owners and going upon the ground and discussing the sales, etc. I acquired a general familiarity with the value of lands in the vicinity of Franklin Canyon in 1912 by going over the ground and knowing the neighborhood. I am familiar with quite a number of sales which were made in that year and in the preceding year of lands that were comparable with the lands that were subsequently purchased for reservoir purposes in Franklin Canyon. The Dry Canyon Reservoir is about 35 miles from the court house in Los Angeles. Land in that vicinity in the years 1908 and 1909 was generally used for farming and stock raising. The San Fernando Reservoir is about 25 miles from the court house in Los Angeles in a northerly or north-westerly direction. That land was put to use for farming and for stock raising. San Fernando Reservoir is only a short distance from the town of San Fernando, and around that is very thickly settled with residences; a great deal of it is in citrus fruits. The Franklin Canyon Reservoirs practically adjoin Hollywood. I suppose it may be a ride of two or three miles from Hollywood to Beverly Hills.

10,108

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Beverly Hills is something like Hollywood, and is being built up with very high-class residences. This reservoir just adjoins Beverly Hills. It may not be quite improved up to the property line.

In the Coldwater Canyon which just adjoins Franklin Canyon it is quite thickly built up with villa sites, and some chicken ranches and summer residences.

This table which I have before me correctly shows the facts as to acreage in fee, and in easement, total price paid, location, and seller's name of these reservoirs, and was taken from the deeds of purchase on file. The information in the last column, headed "Flooded area", I obtained from the Board's files. Taking the Dry Canyon area, cost \$6,600—that is the sum of the cost of the three purchases in that reservoir site, and the average was derived by dividing the total cost of the acreage, including the acreage in easements.

10,109

Questioned by Master.

The acreage in easements was an easement leading off from the reservoir which was purchased, and included in the \$1,000 purchase from Davis. It was for the aqueduct right of way, and not for reservoir purposes. The 16.38 was simply all bought at a flat price of \$1,000, including the 60 acres bought as part of the reservoir site.

DIRECT EXAMINATION BY MR. SEARLS.

In the case of the San Fernando Reservoir price, the average price there does not include the easement on 131 acres. There was nothing paid for that easement. It was thrown in with the purchase of the 218.33 acres. On the Franklin Reservoir was obtained by dividing the total cost by the total acreage purchased. The acreages entitled "Flooded areas" are intended for the present flooding. The reservoirs may not be full at this time, but it is the flooded area with the present structures. With respect to the title "Value of adjoining lands per acre"; that represents my opinion of the value of the adjoining lands similar in character to the lands in the reservoir site per acre, as of the date when the reservoir land was purchased. Under the heading "Acres in easement", the words "Cost, commission" covers land bought in this manner: Hastings took an option on that as a speculation, and the city wanted to acquire it; these were the commissions that were paid to Hastings, and which represents net to him. Price and cost represent the amount his option calls for, while the certificate of title was the amount the city paid. That refers to the following column, entitled "Cost". In the first Hastings purchase the cost was \$27,400, being Hasting's option price, and there was a profit to him of \$4,990, and the certificate of title cost \$100. That was not the first purchase made; that was the last purchase, made in March, 1912.

10,110

10,111

10,112 With reference to the Franklin Canyon Reservoir site, the land outside the highwater mark would be the most valuable because those hills are much more valuable for residence property than the low lands. That land is within the locality of residential subdivision.

Questioned by Master.

Comparing the land above the highwater mark, and the land below, before it was bought, it is my opinion that the land above would be more valuable than the land below.

DIRECT EXAMINATION BY MR. SEARLS.

10,113 With respect to the San Fernando Reservoir, the land outside the area to be flooded, with the exception of up near the dam where it is steep, would be more valuable as of the date of purchase. From the top of the hill where the water is would not be so valuable, but the higher ground on top of the hill, and in back of it, would be much more valuable for building sites and for citrus fruits than the lower which is flooded. They are selling off property right in front of the reservoir at present, and have it practically all set to oranges and lemons. Mr. Curtis paid \$1,000 an acre for his land in that vicinity, which is the slope just to the left of the reservoir dam. He told me that it cost him \$1,000 an acre for the improvements on it.

With respect to the Dry Canyon Reservoir, that is just the opposite from the other. It is remote from any town of any consequence, and I would consider the land in the flooded part of the reservoir more valuable than the higher land.

10,114 Questioned by Mr. Greene.

When I say more valuable, I mean as an agricultural proposition; that is about the only value that reservoir land in that locality would have, and the higher land would only have a grazing value.

DIRECT EXAMINATION BY MR. SEARLS.

The land below the flood line was a kind of an open canyon; it was suitable for barley or grain, or for grazing and dry farming.

10,115 The only value that I can see that the ground in the Franklin Reservoir has, it being remote from any town, would be for grazing outside, and farming on the inside, the lower part. In the case of the San Fernando and the Dry Canyon Reservoirs, it is just the opposite, because they are around a city where they pay a much higher price for high land than they do for the low land for building sites. One is taken upon an agricultural standpoint, and the other upon a building standpoint.

Questioned by Master.

10,116 I think in all the cases of the purchase of these reservoirs that it was known what the canyon was to be used for. In purchasing the Dry Canyon pieces from Annie Moffit, and Hubert Davis, and Willis Norton, I told them that I wanted it for a reservoir. In one case

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Norton reserved mineral rights. All three of them sold it knowing it was for reservoir purposes.

DIRECT EXAMINATION BY MR. SEARLS.

In none of these cases was there any agreement by the city to give the sellers any water. In buying the land from the Mission Land Co., in the case of the San Fernando we did not buy the water; in that case there was an agreement whereby the city was to deliver to them an equal amount of water that they were deprived of by the building of the dam, but the city was not obligated to build any structures to deliver the water. They were simply to pass it through the reservoir. With respect to rights of way, I acquired all those that were purchased from private owners after 1908. 10,117

Questioned by Mr. Greene.

I practically did it all myself.

DIRECT EXAMINATION BY MR. SEARLS.

With respect to the right of way which I acquired, I never had occasion to allow any element of severance damage. We would usually agree upon a flat price for the acreage embraced in the strip. With respect to the area of land adjoining Owens River, which had underlying gravels, and was water-bearing in its character, I bought that portion that was procured from private owners after 1908. I think the prices on the portion I bought run from \$2 to possibly \$15 an acre. I purchased possibly 10,000 acres of it. 10,118

(John T. Martin's tabulation in re land values introduced and marked "Defendants' Exhibit 193".)

With respect to the present intention of the City of Los Angeles with regard to those lands that were acquired on the Owens River: We had what is called an advisory committee to the Board of Public Works, and I was present at the meeting when it was decided to sell the land and retain the water rights, with the exception of about a quarter of a mile riparian to the Owens River, excepting also Tine-maha Reservoir site, which was in that land. That water is intended in the case of a number of dry years to be pumped if necessary. This committee has acted. The only thing they were waiting for was for Mr. Mulholland to decide what portion he wanted to retain. The Moffit Ranch of some 600 acres I have had for sale now for some time. I have sold one ranch, 2,000 acres, and have advertised one of approximately 4,000 acres, reserving the land around the cement plant, and the plant. I sold, also, a fraction of a 40-acre piece to the General Pipe Line Co. 10,119
10,120

CROSS EXAMINATION BY MR. GREENE.

There has not been any of the land which covers subterranean reservoirs sold as yet. All of our lands are mapped off and colored,

and we run a line taking in about a quarter of a mile on each side of the river, regardless of the land over the subterranean reservoirs; it was decided to sell all the land on either side of the river, excepting about a quarter of a mile on each side, and then perhaps the Tinemaha Reservoir; that covers a small portion of these underlying gravels.

10,121 I know where the so-called subterranean reservoir lands of the Los Angeles Aqueduct are located through our chief engineer. The committee to which I referred acts by resolution, but I am not positive as to whether any resolution has been passed by that committee to sell any of these subterranean lands, but I do know positively that that land was intended to be sold, regardless of having the subterranean gravels.

10,122 I would say I purchased about 200 miles of pipe line right of way from the Owens River to Los Angeles. It runs through the Owens Valley, which is a stock-raising and alfalfa country, then down through the desert, and down through Antelope Valley. Some of it runs through almond orchards and grazing ranches. Fully half of it runs through the desert and mountains. I didn't have much trouble purchasing any of it. There was no attempt at secrecy in the purchase of the rights of way, but there was in the lands in Owens Valley. I think every foot of the right of way over which the right of way goes in Owens Valley is owned in fee.

10,123 Questioned by Master.

We bought strips of land in fee 100 feet wide practically all of the way. It was here and there only that we took an easement. In the Owens River Valley in most cases we owned large tracts of land. In some cases we bought the strip, and then bought the land afterwards.

CROSS EXAMINATION BY MR. GREENE.

We did not buy 100-foot strips uniformly for this pipe line. From the Government we bought a 250-foot strip. Through private property I cannot think of a single case where we did not buy as much as 100 feet, except where we got the easement.

Questioned by Mr. Searls.

10,124 The width through the San Fernando Valley narrowed down considerably. I bought a 100-foot strip in the land I bought near the San Fernando Reservoir. After it left the San Fernando Reservoir I think it ran down as narrow as 25 feet.

CROSS EXAMINATION BY MR. GREENE.

I do not think there was any lower than 25 feet. In my right of way experience I have not found any greater difficulty in severing a given piece of land in two than going along one edge of it, so far as my dealings with the owners of the land were concerned. The country around the Dry Canyon Reservoir is hills and valleys. Right up to

the mouth of the canyon it is very fertile, but up in the canyon there is no water. The Newhalls owned a very large ranch there, and we bought an easement through their property. It is full of canyons around there. The topography around the Franklin Canyon is similar to that. They are building up fast with very fine residences, and the land is getting pretty expensive. Coldwater is pretty well built up. There was one party on top of the hill who paid \$100,000 for his place of something like 20 acres. The city would have to pay more for the Coldwater Canyon now than they did. They would possibly have to pay \$250 to \$500 an acre as against an average of \$167.50 originally. That refers to the Franklin Canyon. The Coldwater Canyon I do not think is adapted to reservoir sites, as the dam there would have to be possibly three times or more as long across as compared with the Franklin Canyon Dam, and as compared with the dam at San Fernando, it would have to be at least twice as long. The San Fernando is about three times as long as the Franklin Canyon Dam, possibly, but the dam across Coldwater Canyon I should think would be longer than across San Fernando. I have no idea of how many reservoirs there actually are in and around the City of Los Angeles now.

I don't know of any of the so-called canyon reservoirs in use within a radius of 20 or 25 miles of the City of Los Angeles. The back part of the Dry Canyon goes out gradually, and comes up to a few hills fairly close by, and the dams run right across the narrow point. I don't know of any canyons in and around Los Angeles that will answer that general description, but from a general idea I would say there are a good many. When I was buying the Dry Canyon lands, the first thing I did was to try and make the owners believe they were not very valuable, and they took just the opposite view with me. Davis was a non-resident, and a little hard up I think. We had cash, and I made a special point of that. Norton bought the land for an oil prospect, and I tried to convince him that oil was not there. We finally settled by allowing him to reserve certain mineral rights a certain distance away from the water. Mr. Davis thought his land was most valuable for farming, as did also Mr. Moffitt. They did not urge on me that the land was peculiarly adapted for a reservoir, but we talked about it. I wanted Davis' property for the dam, and he wanted me to take more land, as he thought I would need some for a camp site, and he wanted more money than I paid him for it. I got that very cheap. I bought his best land, which was down from the dam. None of those three parties made the claim that the land had a peculiar reservoir value. Their idea was to keep me up as high as possible, but they did not make any particular claim that there was any particular value other than for farming purposes.

It is my idea that in acquiring land for a public enterprise of this sort, you can get the land just as cheaply, whether the parties for

10,130 whom you are getting it are known or not. My experience has taught me that if you will go to a man and be fair with him, and get his confidence, you can do business with him. I think that in buying property of this kind you get off more cheaply in the long run by telling people what you are going to use the property for, and who the purchaser is, by using this leverage, that we have a right to condemn it, and that it is much better to get together than it is to get into long litigation. I think we had maybe 15 or 20 suits brought in the valley, and compromised every one of them.

10,131 I did not have anything to do with the purchase of the land in the Franklin Canyon Reservoir in 1912. The nearest land to that which I bought in 1912 was within three or four miles. I ascertained the value of land adjoining the Franklin Canyon Reservoir, as of 1912, when it was bought, by looking up Mr. P. E. Weltfong, the son of the man who sold the reservoir, and interviewing him, and he told me that in 1912 he gave Hastings an option on his 80 acres which adjoined his father's land, the Franklin Canyon, for \$300 an acre, instructing him to sell it to the city. I went up Coldwater Canyon and saw W. L. Tullis, and I got information from him and from other people as to actual sales. I went on the ground and found the parties who made the sales and made the purchases, and got the facts from them when I found I was going to testify here. I found that they practically all told me the same thing. That is the way I got my knowledge, from actual sales.

10,132 I could not say that I have the information absolutely first-hand
10,134 of what occurred in 1912 in and around the Franklin Canyon Reservoir as to sales, excepting such sales as I was told about when I had the interviews that I have spoken of, after being advised that I was to testify in this case here. I did not buy any of the reservoir lands in the San Fernando. I negotiated for lands practically adjoining it, I think in the first of 1909, with Price & Bradshaw. Leading on from
10,135 the Bradshaw transaction, I bought from three parties adjoining, right along the line there. That was about the same time, either the latter part of 1908, or early in 1909. That was bought for the aqueduct, for the purpose of a right of way. One of the grantors lived and ran a store at Olive; another fellow worked at a lumber yard at Downey, and the other party worked for the Standard Oil Co. right in that neighborhood. I think I paid the fellow at Downey either \$15
10,136 or \$25, not per acre, but for the small portion, and I think I paid the other fellows the same. I think I took only one-quarter of an acre, or something like that, from each one of them, and made a flat price. I know the fellow at Downey was very particular about going through his bee camp, and I don't think we did. My experience is this, in regard to a right of way through a property devoted to a particular use, that if I was to go on the outside, the fellow wished that I went

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in the center, and if I went in the center, he wished that I went on the outside. That is his talk and his argument all of the time.

Sometimes we have to move a man's house, and we pay all the expenses of moving it. Referring to the San Fernando purchases; the one that cost \$557.20 per acre was a grove, principally of oranges, with some lemons, and olive trees, and was the home of that party, and in very high cultivation. The foot of the dam rested on that piece, and they possibly had an interest in, or were supplied with water from the Mission Creek that ran down to the dam. That grove is still there, and I have it under lease to a party named J. L. Hickson. I think all of that land is out of the reservoir. It is right at the bottom of the point where the dam comes. There are 26 acres there I think, and it was just out of the mouth of the canyon. In general it is located around the toe of the dam. 10,137

The Porter Company purchase is all inside the reservoir. It might not all be inside, and that land, excepting right at the dam, runs off rolling. The north end of it runs out to the San Fernando Boulevard. A great deal of that upper reservoir runs downs the San Fernando Boulevard, and is more or less level. The Porters retain the higher land. Several years ago he planted it all off and into long winding roadways, and they called it the Lakeview Tract. On one of the knolls I wanted to put the power station, which he said was worth \$5,000 an acre, and he didn't want us to put it there at all. We set it right down in the corner of the reservoir land, and are going to throw up a dyke in front of it. 10,138

Questioned by Master.

I was negotiating with him for the power proposition in 1912. The value of adjoining land in 1908 is \$100, according to my idea. I don't agree with him as to the \$5,000. He asked that in 1912, but he will have to spend lots of money improving it before he gets that for it. 10,139

CROSS EXAMINATION BY MR. GREENE.

The Porter land adjoins the Lopez. To explain my valuations for the land adjoining the Lopez Tract at \$500, and the land adjoining the Porter Tract at \$100: You will understand that there is a rise along where that dam comes, and on that slope in front, and on the Porter land also in front, it is all set to citrus; back of that some of the land has been set to citrus fruit, possibly three years ago. That is the lower part next to the road. The higher land next to the reservoir on the east side has been retained for this Lakeview Tract, and the intention is to make a very high-class property of it. In 1908 the front part in front of the dam was in citrus fruit. It would probably explain it better to say that one is set to citrus fruit, and the other is a grazing proposition, farming. The fact that Mr. 10,140

10,141 Curtis paid \$1,000 for his land, and that he had already bought it in 1912 when I was talking to him, and that it was set to fruit would satisfy me that my \$500 was not too low an amount for the land contiguous to the Lopez land in 1908. I don't expect any of that land was sold for less than \$500 an acre, and that is the lowest limit for the citrus fruit land. I don't know how much higher it has gone in that immediate vicinity. I do not know whether there were any other sales in or near the Lopez land in 1908, except the City's purchase. I do not know of any sales as of 1908 adjoining the Porter Tract, aside from the \$5,000 offer in 1912, but I do know of a piece that sold as high as \$1,000 an acre in 1912. It did not cover as good land as I have bought down here at \$100 an acre. I assume that the adjoining land is good land, and that a man who pays \$1,000 for it, pays a great deal more than it is worth. I think it was a hold-up. It was sold to the General Pipe Line Co., and there were reasons for it.

10,142 It is a matter pretty hard to explain how I was able to get the Dry Canyon land for so much under the market. That is what the City pays me for. In negotiating with Mr. Davis, I wanted to buy this piece for the reservoir, and he wanted to sell it all to me. He offered to sell me this piece for \$2,000, and I think I offered him about \$500, and finally we agreed on a price of \$1,000, taking 60 acres in fee, and 16.88 in easement. That land at that time had barley in it, and the higher land was used for grazing. In getting Mr. Norton's land under the market, I presume we talked him out of it. I do not think that because land is available for reservoir use it is less valuable because of that availability. I did not find it that way. 10,143 Moffitt wanted \$50 an acre, and I paid him what I considered the market price. I figure that land around there should be worth about \$25 an acre. It is as good as any land if it had water, and is used for dry farming.

10,144 I do not know of any instance where people held large tracts where we had to buy land that we didn't want. Moffitt had 200 acres, which was a large part of the reservoir floor, and we bought all of it. Davis owned 640 acres, and we simply bought out of it the 60-acre piece, and 16.88 as an easement. We only paid him practically \$10 an acre, or a flat price of \$1,000, whereas, we paid Norton \$15 an acre, and Moffitt \$25 an acre. Where a man only owns 40 acres, we bought it all because he would not want to sell what we wanted, keeping a little piece on either side. I think in one instance where our right of way in the Owens Valley cut off an acre or two on a corner we had to buy a larger tract than we would actually use, because people did not want to split up their holdings. There were two cases where we traded them land on one side for land on the other side.

There are 316.88 acres in Dry Canyon which are actually in use

with the structure as it is at present built. I am sure I never bought from any other person but Moffitt, Norton and Davis in the Dry Canyon. I am sure they never bought from anyone else, unless it might possibly be that the Government had a little point in there somewhere. I did not buy the Government land. I am sure that the only purchases that might have been made, aside from the three enumerated here, are purchases from the Government. As to San Fernando Reservoir, I am sure that the purchases here represent all the purchases that were made for the use of reservoir lands, but as to Franklin Reservoir, they may be some others. Old man Durfee we acquired two 2-acre pieces from, and I did not do the negotiating in that case, but whether that was in the right of way leaving there, or whether some portion of it touched any other part of the reservoir, I am not so positive about that. 10,145

The only purchases that the Aqueduct made for reservoir purposes in San Fernando were 1,093 acres. I lease the land that was not flooded; I am leasing 155 acres of that to a Chinaman, for garden truck, for \$800. I added \$100 to it for a bridge that had washed away across the Mission Creek. The other part we leased to a Spaniard. We have never utilized all of the \$100 to fix the bridge, but I put it in the \$800 in order to cover that. The citrus grove on the Lopez land we lease on shares, and I think we get one-third of the crop. I am not positive what that amounts to, but I think we got last year about \$1500. It is the same way with the Porter property; it is leased on shares, and we get one-quarter of that. 10,146

Questioned by Master. 10,147

I did not have anything to do about the San Fernando and Franklin Reservoir tracts purchases. They were purchased by the Board.

CROSS EXAMINATION BY MR. GREENE.

I know of the amount of drainage land back of the Franklin and Dry Canyon reservoirs only from having been on the ground a number of times. Both of those reservoirs were used as storage reservoirs for the holding of the mountain water for the aqueduct, and so far as I know, that was the purpose of their acquisition. The value I put on the Franklin Canyon and San Fernando lands in 1908 were for farming and for grazing. 10,148

Questioned by Master.

For the Lopez land I put a citrus land value on it, and the other land, the \$100 and \$200 land I gave values for agricultural purposes, with the fact that the higher land always sells for more money in and around cities. At Dry Canyon, however, it was just the reverse. If you have high land it is much more desirable for residential purposes. That has been my experience. 10,149

CROSS EXAMINATION BY MR. GREENE.

I am fairly familiar with the land covered by the Hastings purchase at Franklin Canyon. It is just gradual in incline, and runs up fairly high. Close to the dam it is tolerably steep at the sides, the inside especially, and on the west side it is fairly steep. There is not much steep land in the San Fernando, only at one point where the dam is, and running back a little on the west side, but it opens out until to the eye it would practically look level.

10,150 I only know of the purchases of San Fernando, and at Franklin, from discussing them with the officials in the office, and handling the documents. I have also discussed it with the parties we bought of. In the Mission Land Co., and the Porter Land Co., they reserved the right to farm that land until October 15, 1911, and at the expiration of that time I had the handling and the leasing of it. I had nothing to do with the purchase of the San Fernando or Franklin reservoir lands.

10,151 (Counsel for Plaintiff here made a motion to strike out the value of the adjoining land column per acre, particularly with reference to San Fernando and Franklin lands. The ruling was held in abeyance until such time as the Master can go over the Witness' testimony and ascertain whether he has knowledge of the real estate market in these last two localities.)

RE-DIRECT EXAMINATION BY MR. SEARLS.

10,152 With respect to San Fernando Reservoir, I was purchasing, or negotiating to purchase land adjoining that, and I did purchase from a party who kept a store at Olive, and another a lumber yard at Downey, and the third party worked for the Standard Oil in that locality. Afterwards I took an option on the land adjoining for what turned out to be the General Pipe Line Co. for a station. I think that was about 1912. I acquired information as to the sales other than the ones I made myself that were made in the vicinity of San Fernando Reservoir along about 1912, I think. One of the sales I took for the oil company, and put up \$250. That is out of the Porter piece. The price that the company paid Porter was \$1,000 an acre, and that was, I think, in 1912. Other than the purchases which I made personally in 1908 and 1909, I do not think I know of any other sales which took place in those years. All I have said as to values since then is that those values have increased. I have heard of sales in San Fernando Valley at a less figure than the sum of \$100, which I have placed on two of these. The San Fernando Mission Land Co., whom we bought that land of, only paid \$37.50 an acre for it. That was in 1905 or 1906, and was for land in the valley and in the reservoir too.

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With respect to the Franklin Canyon, I made purchases of rights of way within 3 or 4 miles of the location of the reservoir. Those purchases were made in about 1912 or 1913. I bought a strip 150 feet in width down through the San Fernando Valley. That was in 1912, I think, but as our bonds did not carry, I didn't buy them, very little if any, until the latter part of 1915. It was mostly all valley land on which I bought these strips in 1912 that are within 3 or 4 miles of Franklin Reservoir. I paid \$400 for the right of way. It was not more than one and one-third acres that we took.

10,154

10,155

In the matter of the sales concerning which I recently acquired information, which took place in 1912 in the immediate vicinity of Franklin Canyon: The first man interviewed was P. E. Weltfong, a son of one of the owners of the land that was purchased in the Franklin Reservoir from Hastings. He has 80 acres that join on to his father's land, as I understand it. He showed me where his land extended to on the hill, and it went up nearly to the top of the reservoir hill. He told me that he gave Hastings an option in 1912 to purchase his 80 acres at \$300 per acre, thinking that the City would buy it, but it did not. He gave me the names of different owners I could see. One of those was W. L. Tullis, in the Coldwater Canyon. Mr. Tullis told me he sold to A. S. Haynes 20 acres in Coldwater Canyon in 1912, for \$150 an acre. The wife of Haynes told me that their land adjoined ours right over the hill, and they expected to get a fancy price from the building up of Beverly Hills. Mr. Haynes told me that the price he paid was \$150, with a remark that he wouldn't take anything like that. Tullis also told me that he sold 25 acres in 1912 to O. W. Welch, for \$175. That land was the same kind of land. It was on both sides of the canyon, and including the valley. They gave me the name of P. E. Benedict, and he told me that in 1912 he sold Percy H. Clark 198 acres for \$200 per acre. I was on that land. Mr. Clark told me that he paid \$40,000 for the 198 acres. That land was on the west side of the canyon, practically adjoining the City's purchases. In talking to Clark he told me that he had sold 12 acres to O'Brien, and O'Brien has a tract of land out there too that he has subdivided; he said he sold him this 12 acres at \$1,200 an acre in 1912, or 1913. That land, I think, was closer to the better part of the Beverly Subdivision. He said it was south of the canyon, which would be out in front of it, and that is the same relative position that Beverly Hills holds to Franklin Canyon.

10,156

10,157

Percy Clark handles the Beverly Hills; he is one of the sales agents, and he told me that land ran from \$200 to \$2,000 per acre. I talked with Mr. Sutton, who I think is the secretary of the Rodeo Land & Water Co.; they are the owners of that tract, which is a very large tract, and he said it was pretty hard to give me any information in regard to the Franklin Reservoir; for instance, he said, "Those knolls right in front of Franklin Canyon we are asking

"\$5,000 per acre for, they are nice little knolls, adapted to very fine residences. They are not up very high".

10,159 This land that I have given you is adjoining the reservoir. Peter
10,160 Durfee stated that he sold his land, or some of it, in 1912, for \$250
an acre. I was in the vicinity of this land, in Franklin Canyon, prior
to this purchase, I am sure. I did not go up in the canyon, but I
was familiar with that vicinity many, many times in motoring around
Beverly and to the beach. These canyons do not differ greatly in
topography, but they do in size. Coldwater is approximately parallel
with the other canyon; Benedict Canyon may branch out a little to
the west.

10,161 I think that Dry Canyon is quite within the watershed of the
particular reservoir, and San Fernando I am positive is all of it
within it, but in the case of Franklin Canyon I would judge about
20 acres falls over the slope on the west side.

RE-CROSS EXAMINATION BY MR. GREENE.

10,162 The land that I gave you at \$150 and \$175 an acre represents
the land on the east side, as well as on the other side of the right
from that in which the reservoir is located; the \$2,000 sales, and the
\$1200 sales were in Beverly, and adjoining Beverly. Beverly Hills
is one of the highest class subdivisions around Los Angeles, and lies
right in front of the canyon. That is, it is contiguous, practically,
to the canyon. Taking that land which is contiguous to Franklin
Canyon, I find a range of prices from \$2,000 down to \$150, because
one is paved and has beautiful curbing, and parking, and lighting,
with handsome residences. When you go back out of that territory,
the other is just a rough country road, and no improvements as yet.
I was not in Franklin Canyon prior to the reservoir. I might have
gone into Franklin Canyon, as I have gone into those different
canyons many times, and I would not know their names.

Metcalf

Witness: LEONARD METCALF for Plaintiff.

DIRECT EXAMINATION BY MR. GREENE.

10,163 I have attempted, in this exhibit, to segregate the actual cost
data upon Calaveras Dam along the line of Mr. Lippincott's basis
of direct and auxiliary expenses on that structure, and I have carried
those figures forward on the basis of Mr. Elliott's and Mr. Hazen's
estimates, simply to see whether with the future work anticipated
on this structure there would be a reduction of the auxiliary and
overhead expenses to the direct expenses, as compared with the ratio
existing up to the present time; that is, upon the expenditures up
to the present time. On the basis of the cost to date of December 31,
1915, the general construction costs amount to \$549,670; the auxiliary
costs to \$280,285, the latter being 51.1% of the general costs.

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The preliminary overhead and engineering costs, excluding the general administration costs, amount to \$181,367, which is equivalent to 21.9% of the combined amounts of the direct and auxiliary costs, which latter amounted to \$829,955. The interest-during-construction to date, \$144,618, amounts upon the sub-total, \$1,011,322, which sub-total includes the direct and auxiliary expenses, and the preliminary overhead and engineering costs, excluding general administration, to 14½%. As the work continues, the interest charges will increase more rapidly, by reason of the interest upon the work already completed. Carrying the computation forward on the basis of the estimates which have been made by Mr. Hazen and Mr. Elliott, I found in a general way that the auxiliary cost remains the same; they decrease slightly.

On page 2, in the middle of the page, you will note the parenthetical statement "This is equivalent to 49½% of the above stated direct costs". On page 3 the interest-during construction item, which amounts to \$496,000, is 19% of the combined amounts, bringing the grand total estimated cost \$3,107,000, which is in substantial agreement with Mr. Hazen's figures. Mr. Elliott did not include in his forecast of expenses the cost of the Alameda Tunnel, and of the waste-way, both of which were estimated by Mr. Hazen. Without wishing to imply that the figures are accurate, because, of course, we are forecasting the situation, they seem to indicate in a general way that they are in consonance, or rather, appear to have been in consonance with Mr. Lippincott's figures along the lines of segregation which he has adopted in his analysis of dam costs. You will also note that Mr. Elliott, in those figures which appear upon the first page, and upon the following page, figured simple interest at 5%, and Mr. Hazen used a 6% rate in his computation.

10,164

10,165

Questioned by Mr. Searls.

The charge of \$5,000 to camp is, I understand, the expense to which the company itself has been put, in addition to the expense to which the contractor was put on the camp; the company itself did a certain amount of work on the camp-site, and this covers it. The feeding of the men was done under contract with Mr. Desmond, so that any profit that was made from that goes to Desmond, and not to the company. This is not the total cost of the camp, but it is a portion of the costs which the company itself met, and in the forecast you see that item of \$5,000 which grows out of the fact, I think, that the camp had to be moved, as the level of the reservoir was raised.

Questioned by Master.

The heading "Grand total, Elliott, \$1,188,000", was his estimate of the cost of completing the work, making his cost complete \$1,188,000 against Mr. Hazen's \$1,525,000. The \$818,000 item at the beginning covered Mr. Elliott's direct charges, complete, as he segregated them. I have made use of Mr. Elliott's and Mr. Hazen's figures.

10,166

DIRECT EXAMINATION BY MR. GREENE.

10,167

Taking the figures that were available up to date, as far as expenses were concerned, I reached a percentage of 51%, and then I checked against that to see what it would probably cost for the completed job. I had the idea that to complete the work the ratio of the auxiliary costs would be less than in the first part of the work which had been completed. I wanted to check that on the actual basis of the forecast which had been made quite independently, and for other purposes, and it seemed to indicate that there was not likely to be a great difference. That was the only purpose of using the figures.

("Metcalf's Analysis of Calaveras Dam cost segregated on J. B. Lippincott's Basis of Direct and Auxiliary Expenses, and on actual costs to December 31, 1915, and Hazen's Estimated Cost of Completion, shown in Plaintiff's Exhibit 164, page 11 introduced and marked "Plaintiff's Exhibit 194".)

The next exhibit relates to fair allowance for working capital.

The considerations of major import in determining the reasonable allowance for working capital upon which the company should be permitted to earn fair returns are as follows:

1. Overdue accounts.
2. Supplies, stock on hand, material and equipment for maintenance and repairs.
3. Current supplies required for new construction.
4. Bank balances.

SUMMARY OF CONCLUSIONS.

The flat accounts are charged monthly, and in advance of the rendering of the service.

10,168

The meter bills for the meter service are rendered monthly after service. For economy in reading meters it is necessary to have the meter reader constantly employed. Therefore, the meter bills covering different accounts are rendered at different times during the month. In general, however, there is a lag in the collection of these accounts of approximately 6 weeks, or thereabout.

The rate at which the flat and meter accounts are collected is indicated by the following tabulation showing monthly for the year 1913 the total charges, the amounts collected to the fifteenth of the month, and the balance then remaining due.

I think it is not necessary to read the tabulation. It indicates in general that the average monthly charges for that year amounted to \$268,115, of which \$123,001, was collected to the fifteenth of the current month, leaving a balance due of \$145,113. The maximum total charge was \$280,003 collected to the fifteenth of the current month, \$146,734, balance due \$205,880, a minimum of \$257,549 in total charges, and \$63,613 collected to the fifteenth of the month,

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leaving a balance due of \$123,677. I give the month of December merely as characteristic, and as showing the ratio in a general way between the flat rates and the meter rates, and other collections on the foot of the first page, and on the top of the next page, from which it will be seen that the flat rate charges amounted to \$109,-226.97. The meter rate charges, \$128,699.32; the City charges, \$17,005.43; the building, \$4,721.68; the shipping, \$7,645.86; making the total previously shown \$267,299.26 for the month of December.

Questioned by Master.

That was a month where the collections to the fifteenth were considerably in excess of the balance due, being different from most of the months of that year. If you compare with the average, you will see it is somewhat greater, but the total charges were just about the average; the collections were somewhat better than the normal for that year.

10,169

DIRECT EXAMINATION BY MR. GREENE.

The so-called delinquencies, that is, the balance of accounts unpaid brought forward at the end of the month, covering for the most part accounts 30 days overdue, but also those which are overdue for a still longer period, are shown in the tabulation, Table C.

Where a flat rate is had, and is payable the first of the month, if the bill was not paid until the last of the month, it is included in this delinquent list. That is, if it was paid within the month, it would not be delinquent, but if it was carried over until the next month it would be.

In the case of the meter charges, you have got to take an average condition, because you are reading meters throughout the month. Table C indicates that to be the approximate sum of \$80,000 in the year 1913, maximum \$90,884.24, minimum \$72,081.02, and average \$81,703.56.

I give also a detail of the December delinquencies at the foot of the column, showing flat rate delinquencies \$16,550.51, meter rates \$35,357.64, city \$19,875.64, shipping \$5,601.54, making a total for that month of \$77,385.33.

I went over a number of these accounts with the head of the department, and also conferred with Mr. Eastman with regard to overdue accounts, which accounts for the statement here that Mr. Eastman tells Metcalf that an allowance of \$80,000 for overdue accounts is certainly a fair and conservative one, as he finds it practically impossible to keep these down to a less sum, and that they frequently over-reach the sum, as is indicated by the 1913 record. Recently they have been somewhat more than that. I think in part on account of a recent ruling of the Railroad Commission in regard to the taking of meter deposits.

10,170

The records of other years are very similar to the 1913 records. It is therefore fair to assume it as characteristic.

Conclusion: It seems reasonable, therefore, to assume that there should be included in the "working capital" an allowance of \$80,000 to cover the idle capital resulting from overdue accounts.

10,171

Questioned by Master.

With reference to my note on page 2, to the effect that about \$30,000 each month might be considered nominal delinquency, due to the fact that that amount of bills was read during the last four days of the month, and charged but not rendered until the first of the succeeding month. It is exceedingly difficult to form an exact judgment as to the amount of delinquencies in the meter bills by reason of the fact that you do not read the meters all at the beginning of the month, and then carry them forward. It does not follow that that \$30,000 should be deducted from \$80,000. I have no means of separating exactly the amounts which are delinquent in the meter accounts beyond the statement which we make up in this way by taking delinquencies of the month. The accounts are rendered from time to time periodically through the months, and then the bills are gotten out as rapidly as they can get them out, and are sent to the consumers, so that there is a delay first in the reading of the meters, second in the rendering of the bill after the reading of the meter, and then subsequently in the time of payment by the consumer of the bill after it was read. Mr. A, for instance, isn't certain to get his bill at 30-day intervals throughout the year; there are changes in meter routings, and that sort of thing, but the meter delinquencies, or delay in collections, I think approximate the amount which I have stated of \$35,000 for a 30-day period, as indicated by the December delinquencies of the meter rates.

10,172

The meter rates cover services already done, and not services paid in advance, and the company reads its meters all through the month. The \$30,000 refers to the fact that those are the readings during the last 4 days of the month, which cannot pass through the process of accounting and billing, and getting to the customer until the following month.

DIRECT EXAMINATION BY MR. GREENE.

10,173

Whereas there might be a very few days' delinquency there, as you go further back through the books there would be a greater delinquency than I have taken as an average, and where the average not only covers the average in time, but also both extremes.

2. Supplies, stock on hand, material and equipment for maintenance and repairs.

It is to be noted that if provision is made for these items under the general head of inventories, or stock and supplies on hand, in the estimated gross reproduction cost of the property, they must not again be included in the allowance of "working capital". It would seem more logical, however, to include them in the allowance for "working capital", instead of in the reproduction cost estimate. In

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the estimate of reproduction cost, as of December 31, 1913, made by Mr. Hazen in 1914, which appeared in Metcalf's Depreciation sheets, the following entries appeared. I have given a statement of the subdivisions of items which made up a gross cost of \$401,350, and a net value of \$289,940. On the previous page I gave the records of total charges and collections to the fifteenth of the month for the year 1914, and for 1915, up to June, supplementing the records for the year 1913, which were shown upon page 1 of this exhibit.

10,174

It is assumed that the books, records, etc., were acquired and paid for through operating expenses. Therefore, no value is given to them in figuring the present value of the inventory, although it is, of course, apparent that they are necessary, and of great value to the corporation.

It is to be borne in mind that as a result of the existing situation between the Board of Supervisors of the City, and the Water Co., but little new construction has been undertaken by the company during the past few years, until the recent construction work in the Richmond District. Therefore, the stock and supplies on hand have been materially less than would have been the case under normal construction conditions resulting from the growth in population, and demands of the service. The effect of this is discussed under the following heading.

It is reasonable to assume in the light of recent experience that the amount of capital tied up in stock and supplies on hand, as indicated by the inventories, may fairly be said to have amounted to the approximate sum of \$300,000.

Questioned by Mr. Searls.

I am not including the inventory in my working capital again. I am just covering it here to show it has not been overlooked, and I am excluding it later on. In this discussion I have included it with a statement that if it is included in the schedule, it must then be deducted subsequently from this allowance for working capital.

10,175

DIRECT EXAMINATION BY MR. GREENE.

3. Current supplies required for new construction.

In addition to the stock and supplies on hand referred to in the discussion above, the normal growth in population, amounting to 10,000 persons per year, or more, would under normal conditions and under different relations between the Board of Supervisors and the Company, upon the matter of fair return, involve carrying a larger stock of supplies on hand than has been done during the past 5 years or more. It seems probable that ignoring the major expenses which will be incurred from time to time, as for instance, in the construction of the Calaveras Dam, and the bringing of its waters to the city, construction expenses amounting to approximately \$500,000 per year, more or less will have to be met.

In view of the distance of San Francisco from the pipe market, and the advantage to be gained by placing orders for current needs during the winter months when pipe prices are down at a minimum, it is likely that substantial investment in materials aggregating probably between \$100,000 and \$200,000 will be made during the early months of the year.

10,176

While it is true that the State Railroad Commission allows interest-during-construction allowance in connection with active construction work, it does not, we understand, make any allowance for interest upon investments made out of current income, and it is probably true that funds invested in materials bought for such needs would not be allowed return in interest until the materials were actually put in use in the building of the structures. Under such circumstances, it is but fair that allowance should be made through the return upon working capital for such portion of the reasonable interest charges as would not be covered in the account of interest-during-construction costs.

Conclusions: With an annual construction account of approximately \$500,000, it appears reasonable to allow a full year's interest upon the sum of \$100,000 or more, in addition to the sum covered in stock and supplies on hand previously discussed. This would make the combined allowance for stock and supplies on hand required for maintenance and repairs, as measured by the experience of the past 5 years, plus the allowance for additional new construction demands, total about \$400,000. If any portion of this sum is included, as it has been here, in the reproduction cost of the property, such portion should be deducted from the suggested \$400,000 allowance. In other words, under such conditions as here prevail, I suggest that an additional sum of but \$100,000 be made in the working capital.

10,177

That \$100,000 is only included in my total rating base as applied to a period of years running from 1915 to 1922; as applied to the past period of 8 years from 1907 to 1915, I have excluded it, and have merely used the amount of agreed inventory.

4. Bank balances.

The monthly statement of cash on hand and in bank for the calendar years 1912-1914, and the average monthly bank balances derived therefrom, varying from \$146,782 to \$182,273, are shown in the following tabulation, and it was found by averaging the algebraic sum of the daily bank balances and over-drafts in the year 1914, that the average daily bank balance for 1914 amounted to \$169,819.63.

I show in Table D the amounts from month to month, and the stated average of approximately \$170,000 a year.

It is not fair to assume that this entire sum should be added to the "working capital" by reason of the fact that the collection in advance of the flat rate accounts provides sufficient funds to meet

the current operating expenses without borrowing, except, perhaps, at such times as the payment of interest coupons upon the bonds or dividends may temporarily deplete the cash on hand. The coupon payments, which are generally made between the first and fifth days of June and December, respectively, amount to between \$250,000 and \$270,000 (at each period) and the dividends which are generally paid on March 31, June 30, September 30, and December 31, amount to \$175,000 more or less at each period. The tax payments are usually made about November 28, and April 25, amounting approximately to \$220,000 at each time.

Conclusion: In view of the collection in advance of the flat rates, a nominal sum only should be added to cover bank balances which derive no return. An allowance of between \$25,000 and \$50,000 would probably be fair to cover this item.

10,178

Summary of working capital required.

In conclusion it appears that the overdue accounts involve idle capital in the approximate sum of \$80,000; that the stock and supplies on hand for maintenance and repairs involve an amount of approximately \$300,000; that the new construction material requirements involve an additional sum in excess of \$100,000; and that the bank balances require a further sum of from \$25,000 to \$50,000.

It appears reasonable, therefore, to make an allowance for "working capital" of at least \$500,000, but if any portion of this sum is included in the inventories of stock and supplies on hand required for maintenance and repairs accounted in the reproduction cost of the property, such portion should, of course, be deducted from the "working capital" allowance. It is believed to be more logical, however, to include all these items in the "working capital" requirements.

Now, as applied to what has actually been done by me in this case, I would say that I have assumed a working capital for the period 1907 to 1915 of \$100,000, and for the 8-year period following 1915, in discussing the future, an additional sum of \$100,000; or in other words, for the period concerned in these rates, a working capital of \$100,000, and for the future 8-year period a working capital of \$200,000.

("Working Capital, July 17, 1915, Leonard Metcalf" introduced and marked "Plaintiff's Exhibit 195".)

10,179

This estimate of earthquake losses in 1906 has been made up by Mr. Sharon and myself. We estimate that on the structures approximately \$810,000 of losses were incurred, and in dividends approximately \$1,054,000, making a total of \$1,864,000.

Note further that loss in dividends is predicated upon the 1902 ordinance-schedule of rates, which was subsequently declared to be confiscatory, and that no depreciation allowance was made by the company until the year 1908. The analysis of the loss in dividends

is therefore made upon the assumption that no depreciation allowance was made during the period under discussion, 1903-1908.

There are shown as related to the structures two columns of figures, one being the estimate by the City Engineer in 1912, with Judge Farrington's overhead allowance of $12\frac{1}{2}\%$, the other being the estimate of Mr. Elliott, as made in 1912. The two estimates are nearly in agreement. Mr. Elliott's amounting to \$816,965, the City Engineer's to \$806,790. The City Engineer's was corrected by the addition of the items of the Pilarcitos pump and the Locks Creek Aqueduct. Mr. Sharon called my attention to the fact that Mr. Elliott's estimate is also based upon Judge Farrington's figures.

10,180 Mr. Sharon: The amount of \$200,000 for city pipe system loss was taken from the City Engineer's report, as it appeared in the Municipal Reports of San Francisco, and I did not know whether the City Engineer had intended to include $12\frac{1}{2}\%$ in that item, as the $12\frac{1}{2}\%$ was not included in the Pilarcitos pipe line, and in the Lake Honda Tank; as a matter of fact, the $12\frac{1}{2}\%$ has been added. (This statement was made to explain the note reading: "This amount probably 'should also be increased by Judge Farrington's allowance for overhead and interest of $12\frac{1}{2}\%$ '".)

10,181 Mr. Metcalf: Turning now to the loss in dividends; as a means of getting at the net revenue, there is considered the gross revenue. The gross revenues for the years 1903 to 1905 were \$2,076,000, \$2,212,000, and \$2,300,000. Those were the actual rates which were the ordinance, 1902. There was not any money impounded in those years. These earnings were forecasted by carrying the curve of gross revenue for the past period of years forward for the following period of three years, and giving us for the years 1906, 1907, and 1908, \$2,400,000, \$2,500,000, \$2,620,000, as we estimate the gross revenue would have been had there been no fire. The total probable gross revenue then for this period of six years, had there been no fire, would, in our judgment, have been approximately \$7,520,000; the actual revenue was \$5,696,000, involving a loss in gross revenue of \$1,824,000. This computation gives a basis for determining the loss in divisible revenue during this period. The Spring Valley Water Co. paid dividends, no allowance, of course, having been made for depreciation in the renewals during the following period; some items of renewals were charged in the operating expenses, and of that we have taken no note here. In 1903, \$529,200; 1904, \$521,889; 1905, \$532,330, making a total of \$1,583,419.

10,182

Had the business continued, and had no allowance been made for depreciation, it is probable that the company could have paid from its estimated gross revenue (after allowing an increase of approximately \$50,000 a year for operating expenses and taxes, and a total increase in the revenue of about \$170,000) during 1906, 1907 and 1908,

over that received for the three years, 1903, 1904 and 1905, of \$1,750,000. The company actually paid in the period from 1906 to 1908 \$416,133, and actually allowed during one year of this time for depreciation and contingencies in the year 1908, \$280,000, making a total of \$696,000, which, deducted from the above stated sum, \$1,750,000, gives a loss in dividends, excluding the assessment of the stockholders to rehabilitate the works of \$1,054,000. This loss of \$1,054,000, plus the loss in structures of \$810,000, makes up the total originally stated.

When I say "allowed for depreciation and contingencies in 1908", I mean that they actually set aside out of their earnings this allowance for depreciation. It was the first year in which it had been done, and in order to make our result comparable, since we are dealing with differences, we eliminate that from discussion. We could have included it in both cases in the estimate, and the actual returns, and it would have made no difference.

10,183

("Earthquake losses in 1906, April, 1916", introduced and marked "Plaintiff's Exhibit 196".)

("Fair cost of money", introduced and marked "Plaintiff's Exhibit 197".)

I have here a revised copy of Plaintiff's Exhibit 12-H, about which there was some question a few days ago, in which I have modified the heading of the last two columns in order to do away with the ambiguity which was apparent as we had it before, to read as follows in the next to the left column: "Approximate normal yield with present developments," the total of the Peninsula system being 20 million a day, as testified to by Mr. Hazen, the Merced Lakes 3½ million, and the Sunol and Livermore sources 21 millions, corresponding to the capacity of these lines, with the booster station in operation, making 43½ millions. The last column, "Yield in years of extreme dryness, under "assumed economic future development", in which you will note the Peninsula system, 18½ million gallons instead of 20 millions, it being assumed that in a long period of years there would be some dry years in which 20 million gallons could not be realized; the Calaveras approximately 45 million gallons, as testified to by Mr. Hazen, and the Arroyo Valle 20 million gallons, the Sunol and Livermore gravels 26½ million, making a total of 110 million. The column of the approximate figures add up to 110, and the Coast streams 50 millions, making a total approximate amount of 160 millions, all in accordance with Mr. Hazen's testimony.

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(The original Exhibit 12-H is retired, and this corrected exhibit of "Approximate normal capacities of plant" marked "Plaintiff's Exhibit 12-HH".)

10,185

ONE HUNDRED AND THIRTY-NINTH HEARING.

APRIL 18, 1916.

Witness: LEONARD METCALF for Plaintiff.

10,187

(The witness stated that the exhibit on the Calaveras Dam cost was used merely in an attempt to see what the ratio between the direct and auxiliary expenses have been upon that structure for purposes of comparison with assumptions that were made by Mr. Lippincott in some of his work. No direct use was made of the exhibit. Also that no direct use had been made of the exhibit as to earthquake losses. It has been referred to once or twice in the discussion, and has some bearing, perhaps, upon the hazard of the business and the actual expenses to which the company has been put just prior to this period.

10,188

Counsel for Defendants suggested, in relation to the Calaveras Dam exhibit, that it had been frequently remarked by Counsel in this case about the danger of taking incomplete jobs as a basis for comparison, and in this particular instance the use of such incomplete costs, coupled with the estimates of two or three men other than the witness as to the future cost is apt to be rather confusing, for the reason that it might be supposed that the greater part of the indirect cost chargeable to equipment would be incurred in the early history of the structure, and that probably these estimates that have been made heretofore for future construction include some elements of that sort.)

Metcalfe

Mr. Metcalf: I would admit the strictures suggested by Counsel for Defendants. Of course we cannot look forward with positive assurance that those conditions will be realized. However, a very considerable part of this plant is of a perishable nature, and goes to pieces during use. I refer particularly, for instance, to the pipe used in carrying the water and gravel to the dam, and the pumps, so that part of the plant we think we can forecast with some assurance. Of course as to steam shovels we have made the other assumption that those will have the scrap value after the completion of the work, and that has been taken into consideration. It is in that way, perhaps, a little different from some other structures where more material is actually used in the construction of the work.

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The situation between the company and the city in the past may, at a certain period in the construction, have influenced the speed of the work unfavorably. I do not think that that has been a very large influence. On the other hand, the material which has been found available for the building of the dam has not been as satisfactory as was anticipated when the original estimates for the work were made, so that the cost of the final structure will be very substantially in excess of the original estimates which were made, and it has proven

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necessary and desirable to use steam shovels there in addition to bringing in material by water carriage, which was not anticipated in the original plan of the work, and which has very substantially increased the cost, but which was absolutely essential with the materials which were actually found available when they got into the work.

Mr. Greene: We will claim in the capital valuation of the plant in 1913 the expenditures to date on the Calaveras job, but this matter here is not evidence in that behalf. The evidence is contained in the inventory, where the costs as costs alone, up to December 31, 1913, are set forth. Those costs in the inventory correspond with the estimates we have just filed.

10,190

Mr. Metcalf: The interest-during-construction was greater, and the overhead excessive on the Calaveras Dam for a certain period. I should have said that was in the year 1914. I think the work is being prosecuted now with diligence.

10,191

Witness: LEONARD METCALF for Plaintiff.

DIRECT EXAMINATION BY MR. GREENE.

I will now take up the Exhibit 197 on the cost of money to the Spring Valley Water Co. On the first page is the table of contents showing the ground covered. On page 2 the discussion begins with an interpretation of the diagram, tabulation and notes relating to the rates of return, or rather to the cost to the Spring Valley Water Co. of money raised upon bonds and stocks, and net earnings reinvested in property. This diagram reflects in a striking manner the financial experience, and has an important bearing upon the fair rate of return upon the property of the Spring Valley Water Co. The diagram is on page 7.

The predecessor companies, the San Francisco City Waterworks, and Spring Valley Water Works, were organized in the years 1858 and 1860, respectively, and consolidated in the year 1865 as the Spring Valley Water Works, operating as such until the year 1903, when the properties were taken over by the Spring Valley Water Co.

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The diagram indicates first, that the actual average rate paid for money raised upon bond issue fell from 12% in 1866 to approximately 7% in the years 1879 to 1886; 5½% in the year 1888, 5% in the year 1905, 4.65% in 1906 to 1912, and 4.79% in 1913 and 1914, the rate rising a little at the end, owing to the inclusion by me of the bond issue of the collateral trust notes, which were mortgage notes. The rate was nominally 5½% on the collateral trust notes. The 4.79% that I have used here is owing to the issue of those notes, which cost the company 7.22% on one year, and 6.22% on the other. Those notes covering an issue on December 1, 1913, of \$1,000,000 which was taken

up and refunded by the two-year 5% collateral notes issued September 1, 1915, amounting to \$2,500,000, the effect being to increase, of course, by the fact of the rate actually paid upon the outstanding bonds, something over \$17,000,000, which were nominally a 4% face rate, but the cost of which was 4.65%.

10,193 I consider these short term notes the same as bonds in this computation. If you wish to eliminate those the rate would continue 4.65% to the end of that time, but the inclusion changes it to 4.79% in the year 1913-14.

10,194 On the lower part of the diagram, page 7, are shown the bond issues in amount and date, just to give an idea of the time when these issues were made. In the upper part of the diagram are shown, first, the nominal rate of interest upon the various bond issues as they were put forth. That is shown in dash and dot line, with triangles at intervals upon it, beginning in the year 1862 with 10%, running up in the year 1863 to 12%, and then down to 10%, and so on down to the present nominal face rate of the bonds, 4%. The line next above this, which is a dash line with solid black squares upon it, represents the actual rate of interest paid upon the outstanding issues of the bonds; in other words, at times there were outstanding more than one set of bonds, and this gives you the actual rate paid upon those. By the light dot line, with open circles upon it, is shown the average rate of return upon money raised by stock and bonds, measured by coupon interest, dividends paid, sinking fund requirement to amortize the discount and recorded expenses upon the bonds and earnings reinvested in plant, from which rates must be deducted on the depreciation requirements and contingent reserve up to 1908, in which year the company first began to set aside a depreciation allowance.

Questioned by Mr. Searls.

10,195 The amount of the dividends are divided by the selling price of the stock, or the selling price advanced by the money reinvested in the property, which would tend to increase the value of the stock. In other words, Reynolds, from whose evidence this table was made up, in so far as it relates to stock transactions, reports the advance in the value of the stock which was predicated primarily, I believe, upon the additional money reinvested in plant out of the earnings, and it was in fact reflected by the advance in the selling price of the stock as we found in confirmation from newspapers and various manuals from which we got records for comparison with Mr. Reynolds' statements, so that this is the actual rate of return upon the money which was put into the stock, and not the nominal face rate. We took the selling prices of stock which were reported by Mr. Reynolds, and which did, I believe, reflect the earnings put back into the property. We checked those by the actual selling prices as we found them reported elsewhere, and the agreement was very fair. We first accounted the

money earned as a profit, and then it went into the property and became part of the plant account, so that it tended to swell the rate first, and then went back into the property as capital account; in other words, if you made a profit of \$1,000,000 on the property, we accounted that as return upon the stock, and then the following year, if it was reinvested in property it became part of the property, and the value of the stock advanced by the pro-rata amount.

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DIRECT EXAMINATION BY MR. GREENE.

The upper line of the diagram shown in light dots with light open circles which covers the average cost of money as raised upon the stock and bonds and profits reinvested in the property, does not take into consideration any allowance or deduction for depreciation, as no such deduction was made by the company until the year 1908. Therefore, if it is desired to discuss the matter from the point of view of the net return, or the return after deducting depreciation, an allowance should be made for this depreciation. I have taken an allowance off, as will be seen later in this discussion, and shown on the diagram, a line in full black with heavy black dots, as the average rate of return determined from the lines with light dots and open circles, after deduction of allowance for depreciation. I took that allowance for depreciation as a certain percentage from the rates; I took off 1% as the allowance for that.

10,197

Questioned by Mr. Searls.

The light dotted line with the open circles is based upon the actual dividends paid, plus an allowance for the surplus earned during that period. I readjusted the accounts so as to show as part of earnings what was in fact charged off to depreciation.

10,197½

DIRECT EXAMINATION BY MR. GREENE.

In the heavy black line beginning with 18% in the year 1859, running down to 12½% in the year 1865, 6½% in the year 1888, and 6% in the year 1903 and thereafter, I have shown what I have assumed as the fair cost of money upon the property of the Spring Valley Water Co., excluding any profit allowance, and assuming that depreciation is to be provided for from the operating expenses. The reason for the assumption of that line on this diagram is that the average rate upon money raised upon such property as this is substantially in excess of the actual rate upon its bonds, in general 50% more or less in excess of that rate. As testified to by Mr. Weeks in this case, the bond houses dealing in bonds of this sort require that the net divisible revenue shall be from 1½ to two times the amount of the coupon interest upon the bonds, and if the bond issue covered three-quarters of the value of the property, or the amount involved in the construction of new work, this means that there must be an excess in general of 50%,

10,198

more or less, over the bond rate; it may be somewhat less than this, as low as 25% or 30%; in cases of great hazard it would be more than 50% rate.

10,199 In such a case as this, where a very considerable part of the property is in land, the average rate will be less than under other circumstances where the greater part of the property value lies in structures. I have assumed here something less than a 25% excess over the bond rate. Obviously the rate of return cannot be less than the actual cost of the money raised upon bonds. You will see throughout this diagram virtually after 1882 the rate of return upon the stock and bonds, and profits reinvested in plant, have been about equal to, or less than the actual cost of money raised upon the bonds, all of the outstanding bonds. That is apparent from the dip in the light dotted line as compared with the long dash line with the solid black dots. It appears from that that during the period from 1871 to 1877, or thereabouts, the earnings of the company were large, were very substantially in excess of what I have assumed as the fair cost of money to the corporation, and that after the new Constitution was passed, and the rates were fixed by the Board of Supervisors, the return fell very sharply, that is, in the years 1879 to 1883, and has continued low since that time.

Second: The diagram indicates that the average rate of return enjoyed by the company upon its investment, as measured by the proceeds of sale of bonds and stock, plus net revenue reinvested in plant, excluding allowance for appreciation, but including an allowance of 1% of the structural plant investment per annum for depreciation, was about 12% up to the year 1877 inclusive; 9.7% in 1878; approximately 7% in the years 1879 to 1882, after the rate regulation of the Water Commissioners in the year 1878, and the Board of Supervisors in the year 1880; 3.0% in 1883; 4.5% in 1884; and general decreasing amounts from 5.5% in 1885 to 4.3% in 1900; 3.6% from 1901 to 1905, inclusive; 2.2%, 1.5%, 3.3% in 1906-7-8; 4.2% to 4.8% from 1909 to 1914, as based upon the ordinance rates, or 5.2% to 5.7% on the ordinance rates, plus 15%, all of these rates being predicated upon the joint proceeds from the sale of bonds and stock, and reinvestment of profits, without provision for the appreciation in values which occurred in fact, but with allowance for depreciation of 1% annually upon the structural plant costs. In that case the word "costs" was used advisedly, as that was actual costs, and that is true throughout this discussion.

10,200 Third: That the profits of the company were fairly commensurate with prevailing rates of return upon enterprises of like hazard hereabout in the period of years from 1856 to 1878, being, perhaps, liberal during the years 1874 to 1878; that after the passage of the new State Constitution in 1879, which became effective in 1880, the rate of re-

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turn fell rapidly, being less than the cost of money raised by the corporation upon its bonds during the period of years from 1883 to 1914, inclusive.

Fourth: That the cost of money to this corporation, as indicated by this analysis, may reasonably be said to have ranged from 18% in the year 1858 to 12.5% in the year 1866; 6.5% in the year 1888, and 6% in the year 1904, and thereafter, and as previously stated, this makes no allowance for profit, and is predicated upon unusual credit conditions and unusually large margin of value behind the bonds issued by the company.

It cannot be doubted that the fair cost of money to any corporation is substantially in excess of the actual (not nominal) rate at which the corporation is able to borrow money upon its first mortgage bonds, even when the amount of these bonds approximates but one-half of the value of the property, and, broadly speaking, equals the value of the real estate holdings alone, exclusive of structural and intangible values, as in the case of the Spring Valley Water Company. The amount of the excess in the fair cost of money over the actual bond rate is dependent upon the financial history, character and environment of the property and the hazards of its business. Under ordinary circumstances such excess is approximately 50%, more or less, upon the actual bond rate,—that is the face rate—depending upon many things, more important amongst them the relative amount of the bonds issued upon the property and the ratio of the available divisible net revenue to the coupon requirements of the bonds.

The most conservative financial houses require that the available net revenue shall be at least double the coupon requirements, though many houses in good standing lower this ratio to $1\frac{1}{2}$ times the bond interest requirements. 10,200 $\frac{1}{2}$

The following tabulation indicates the excess of the average cost of money as compared with the bond rate upon these two assumptions: 10,201

Ratio of Bond Issue to Total Value	If Available Net Return is 2 times bond interest requirements	If Available Net Return is $1\frac{1}{2}$ times bond interest requirements
	Ratio of Average Return to Bond Rate would be	Ratio of Average Return to Bond Rate would be
$\frac{1}{2}$ Bonds.....	1.67:1	1.31:1
$\frac{3}{4}$ Bonds.....	1.50:1	1.125:1
$\frac{7}{8}$ Bonds.....	1.33:1	1:1

It indicates that where the available net revenue is two times the bond interest requirement, with a ratio of bond issue to the total value of seven-eighths, the ratio of average return to the bond rate would be one and two-thirds times the face rate of the bonds.

Questioned by Mr. Searls.

10,202

That table is purely mathematical. These conclusions are not based entirely on Spring Valley experience, this is a fact: If the bonds cover but seven-eighths of the debt, and the available net revenue is two times the amount of the coupon requirements, the remaining undivided return, after deducting the bond interest rate, predicated upon the remaining one-eighth, will give you such a return that the average on the entire property will be, one and two-thirds times the bond rate. That is a mathematical computation in fractions.

If the bonds amount to three-quarters of the total funds raised, and the available divisible return be two times the bond interest requirements, the average cost of the money will be one and one-half times the bond rate, and if the bonds be two-thirds of the entire amount, the average cost of the money will be one and one-third times the bond rate. Similarly, if the ratio be one and one-half times the bond interest requirements on seven-eighths bond issue, the average cost of money will be 1.31 times the bond rate. With three-quarters of the money raised on bonds the average rate will be one and one-eighth times the bond rate, and with two-thirds of the money raised upon bonds the average rate will be the same as the bond rate.

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It will be seen from the above table that we find more usual ratios of bond issues to total value of property (varying from $\frac{2}{3}$ to $\frac{7}{8}$) and the available divisible net revenue, varying from $1\frac{1}{2}$ to two times the bond interest requirements, the excess in rate of the average cost of money over the bond rate is from 30 to 50 per cent. Under the conditions here prevailing, with such large real estate holdings, and conservative amount of bond issue as compared with the investment cost and fair value of the property, a somewhat smaller excess, may fairly be assumed. While it is believed that an excess of 25% would not be unreasonable, the actual amount has been assumed at slightly less than this. Or, if the matter be discussed in terms of the additional rate in per cent. over the actual bond rate, the assumed allowance has varied from approximately 2% in the early life history of the plant to 1%, more or less, during its later life, said excess in interest being in addition to the actual bond interest of approximately 12% at the beginning of this period, and 5%, more or less, during the late life history of the plant.

The diagram clearly indicates, that beginning with the year 1879, the company has not received a rate of return fairly commensurate with its actual investment. Even though it be assumed that in a project such as this, involving very large land holdings, the rate of return should be somewhat less than in one having comparatively small real estate holdings, and should more nearly approach the actual cost of money raised upon the bonds of the corporation, some margin of profit must be allowed to the operator to make the project attractive

and induce him to go into the business, and to make further investment in the property attractive to prospective bondholders. Without this profit margin (in excess of the cost of money) the market for the corporation's securities would soon be affected, the corporation would have difficulty in borrowing additional funds for its extension work upon advantageous terms, and there would be likely to result a declining service, followed by a marked increase in the future cost of capital to the corporation. The first influence has already been felt here; the second must, it is believed, inevitably follow unless happier relations prevail with, and more certain and advantageous financial arrangements are facilitated by the city, than have existed during the past eight year period.

10,204

The diagram indicates that during the period 1899 to 1901, the rates were reduced to such a point as to make the actual rate of return upon the investment cost of the property substantially below the bond interest rate, and the return upon the appreciated value of the property still more inadequate. In 1906 and 1907 the conditions were even worse, as a result, of course, of the earthquake of April, 1906, and the fire following it, which resulted in such a destruction of property and redistribution of population in and about San Francisco as to seriously impair the gross and net revenue of the Spring Valley Water Company. While there has been some recovery since that time, the diagram indicates that during the years 1909 to 1915, the average rate of return has been below the actual bond rate, without margin of profit. The effect of such conditions, if prolonged, must result in causing a declining service and in raising the rates at which the company may hereafter be able to finance its future needs for new capital.

Questioned by Mr. Searls.

The stock advanced from about \$40 to \$60 in that time in spite of the terrible depression, but even so, the value of the property, as measured by the stock and bonds, was below the fair value of the property, as I believe. I have an exhibit here to introduce later, which will show the value of the property as indicated by the selling prices of small blocks of stock and bonds that were sold to have varied from \$21,500,000 at the beginning of the period to the high point of \$37,000,000 odd during this past eight year period. I believe at no time during that period was the value of the property so low as \$21,000,000, or, in my opinion, so low as \$37,000,000. I did not increase the base upon which I figured the net rate with the increase in the selling price of the stock at all, unless there was reinvested in the property an undivided profit corresponding to that advance. We took the original investment as a base for our figures.

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DIRECT EXAMINATION BY MR. GREENE.

The selling price of the stock and bonds plays no part at all in this table, except as we used the reported sales of stock in the seventies

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and the eighties, perhaps, as a means of checking to Reynolds' figures which we used, which figures purported to give the actual payments for the stock in the first instance, increased by the amount of profits reinvested in construction by the company; in other words, those figures were used only to enable me to check the figures on the original investment.

10,207

For convenience in comparison I have assembled upon page 6 of this Exhibit 197, the various interest rates for the period of years from 1866 to 1914, the record of 1915 not being available at the time that we did this work, and that was the only reason for exclusion—as follows: In column 2 are given the nominal interest rates upon the succeeding issues of bonds, decreasing from 12% in the year 1866 to 4% in the year 1903. In column 3 the nominal interest rates on outstanding issues, being the average outstanding issues, being the average interest rates on the face value of the outstanding bonds, without accounting the discount or premium. In column 4 the actual interest rates upon outstanding bond issues, the average interest upon the proceeds of bonds, including allowance for amortizing of discount and expense, and of course treating the premiums in the general way that the discounts are treated, the premium tending to decrease the rates, the discounts to increase the rates. In column 5 is shown percent return upon the selling price; that really should be upon the cost at issue of the stock, increased by earnings reinvested. I have used the term "selling price"; it was the selling price at the time of the sale of the stock, and is not the selling price at a later date. In column 6 is shown the return upon cost of money raised upon bonds and stock and reinvested profit, without depreciation allowance deduction, decreasing from 13.1% in the year 1866 to 2½% in the year 1907 at the time of the earthquake. At the foot of this column there are shown two columns; one on the left having a rate of 3.3% for the year 1908, the one on the right 4.3%; the one on the left corresponding to the earnings upon the ordinance rate, as passed in 1902, the one on the right to the ordinance plus 15%. That forms the basis of the present rates, the ordinance which was passed in 1902. Of course the figures which I cite relate to the year 1908. In column 7 are shown similar figures for the cost of money raised on bonds and stock, and reinvested profits, after deducting from the previous column 1% allowance for depreciation per annum.

On and after the year 1908, the figures are based upon the company's actual practice of making an allowance of \$260,000 for depreciation. I have accounted on page 8 that and the \$60,000 additional amount for contingent depreciation reserve, giving me in the year 1908 the 3.3% net amount as based upon the ordinance rates excluding the 15% excess collected, impounded, and now at issue, and as applied to the investment cost up to that date.

Questioned by Mr. Searls.

The \$260,000 is an equal annual payment, and you will see later on, when I discuss the rating base, that I have deducted annually the allowance for depreciation less the replacements. By the sinking-fund method of application, the rate which you get is made up of two items; first, the annual rate, assuming that you have a fund corresponding to the accrued depreciation, and second, the interest upon the theoretically-acrued fund. The first amount is something like \$130,000 or \$140,000, and the second amount is about equal to it, so that the total amount which you get by the sinking-fund application amounts to about \$260,000.

10,208

Taking the original cost in one case, and applying a percentage to that, and in the other case the reproduction cost and the sinking-fund method, or the equal annual payment method, the result is not far different.

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We made, in connection with the development expense analyses, certain computations in the first place without deducting the abandoned properties at the time of abandonment, but upon the assumption that the accrued depreciation fund must, as of the year 1913, provide for that abandoned property, as well as for the depreciation upon the existing property. Now, on that basis, with straight-line depreciation, and using the original cost figures which Mr. Dockweiler went over, and in which we are substantially in consonance, without interest allowance or overhead, and added by me to the original conditions, but with the 2% annual increment in land values, basing the depreciation upon the structural cost only, we get a depreciation rate of $1\frac{1}{4}\%$ upon the structural values, and we get a total depreciation allowance on that basis, increasing from \$22,000 a year in the year 1866 to \$269,000 in the year 1914. Now we figure that also on a straight-line basis, without any land increment, and the depreciation is $1\frac{1}{4}\%$, the same amount.

Questioned by Mr. Greene.

The land depreciation does not enter into that computation. The amount upon the depreciation of structures is the same. We figured it also on the basis of a 5% sinking-fund. This was to accord with Mr. Hazen's figures that we first did this; he used 5% sinking-fund, and we find that the annual rate is one-half of 1%, and of the year 1914 that the contribution for the year amounts to \$106,530, and the 5% interest upon the accrued sinking-fund amounts to \$344,000 more, so that the combined amount would be \$450,000 for the year 1914. The accrued depreciation sinking-fund is made up of two parts. First, the annual contribution, and second, the accretion upon the funds.

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I have not applied this as a sinking fund. I have applied this as a straight percentage each year of the structures. It is not a

10,211 straight-line method, properly speaking, because I have not taken any estimate of life. I have taken a straight percentage of that.

Questioned by Mr. Searls.

I have not applied it to the depreciated value of the structures. I have applied it to the original cost, not the depreciated amount. If you want to apply it to the depreciated amount, you simply use a slightly higher rate; that is all the difference it would make.

DIRECT EXAMINATION BY MR. GREENE.

10,212 In column 8 are shown the rate of return upon cash investment in bonds and stock, excluding profits reinvested, with sinking-fund provision for amortization of discount, and recorded expenses on bonds, first without allowance for deficits in return, that is, in column 8, and second, after making such allowance for deficits in fair return, carried into investment cost, shown in column 9. These two sets of figures shown in column 8 and 9 were submitted in "Plaintiff's Exhibit 12-BB" and "12-CC", and are added here merely for the purpose of comparison with the other rates, it being a somewhat different method of computation. In column 10 is shown my assumed fair cost of money to the Spring Valley Water Co., excluding the profit item, and assuming that allowance for depreciation is accounted as an operating expense; that is the rate shown by the heavy black line upon the diagram upon page 7, varying from 12½% in the year 1866 to 6% in the year 1902 and thereafter.

10,213 We come now to the tabulation on page 8, which gives in detail the information concerning the issue of, first bonds, and second, the stock, and then the reinvested profits. In column 1 we have the calendar years. In columns 2 and 3 of the upper portion of the tabulation are shown the face amount, and actual rates upon the first series of bonds issued, bearing 12% interest, payable quarterly, maturity being in 1868. Similar information follows in columns 4 to 11, both inclusive, as to the bonds issued and outstanding in the year 1863 to 1885, inclusive, and in columns 2 to 9 of the lower portion of the table as to the year 1886 to 1914, inclusive.

Questioned by Mr. Searls.

This actual rate is not the face rate on the bonds. It is in some cases. It is not unless the bond was sold at par without expense. The nominal face rate in each case is shown under the caption, as for instance, taking the second mortgage bonds in columns 4 and 5 of the lower part of the tabulation; that was the 4% bonds, payable quarterly, and the actual rates vary from 3.99 to 4.37. Then follows a statement of the total face amount outstanding, the nominal rate upon all of the bonds outstanding, weighted by the amount of the different issues, and rates appertaining to them, and the actual rate which takes into account any premium or discount, or expense involved.

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DIRECT EXAMINATION BY MR. GREENE.

In column 15 of the upper portion of the tabulation, and also of the lower, the excess of the actual over the nominal rate, merely added as a matter of interest, to show the effect of the discount and premium and expenses upon bonds issued by this company during this period of time; similar information is contained in columns 16 to 19 relating to the stock outstanding; column 16 the face amount; column 17 the average selling price at date of issue, and in column 18 the dividend rates paid; in column 19 the resulting rates on the selling price at date of issue of the stock, as for instance, in the year 1867 there were \$6,000,000 of stock outstanding, the average selling price being 58.2, the dividend paid being 6%, which upon the selling price of 58.2 is 10.3% rate. In columns 21 to 24, inclusive, are given the proceeds of first, the bonds shown in column 21, second, the stock sales shown in column 22, third the profits reinvested, shown in column 23, and fourth the total of these three, which is shown in column 24. These figures relating to the profits reinvested being based upon the testimony submitted by Mr. Reynolds in the previous rating suit. In column 25 is shown the interest and sinking fund amounts for amortization of discount, and expenses upon bonds. In column 26 are shown the dividends of stock; in column 27 the net earnings reinvested; in column 28 the sum of these two. We credit the reinvested earnings as earnings first, and then as capital account, and this is without deduction for depreciation of the property, and in column 29 the resulting rate upon the stock.

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Questioned by Master.

I am wrong in stating that column 28 is the sum of columns 26 and 27. In column 29 is shown not the return upon the stock, but the average rate of return upon the property.

DIRECT EXAMINATION BY MR. GREENE.

In column 30 the ratio of the rate of return to the actual bond rate; in column 31 my assumed fair cost of money to the Spring Valley Water Co., corresponding to the heavy black line shown on the diagram. The result in column 30 is the ratio of column 29, which covers the total returns, to the average rate upon the bonds which is shown in column 14 the actual rate. After the year 1907 there is a break in a diagram, and the statement "on and after the "year 1908 depreciation allowance of \$250,000 per annum was accounted", and I made a fair allowance of \$60,000 additional amount for contingent depreciation reserve, and I have figured the return in two different ways, as appears in the two different tabulations following that, the one based upon the ordinance rates with, and the other without the 15% excess. You will note that the amount shown in the lower tabulation on the right, on the line marked 1908.

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column 25, \$267,912, as taken for a period of 7 years, amounts to \$1,876,000 approximately, or for a period of 8 years to \$2,144,000, which is comparable, if I understand Mr. Bailhache's figures correctly, in the exhibit which he recently put in, of the surplus of the company, that is $2\frac{1}{4}$ million dollars, or thereabouts, of what he calls net profits, I think, which were reinvested in plant during this eight year period of time.

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On page 9 will be found the detailed computations, showing the method of determining the sinking-fund necessary to amortize the discount and expenses upon these securities, which goes to increase somewhat the actual cost of money raised upon these securities, as for instance, to increase the actual rate upon the bonds as compared with the nominal or face rate. Starting with the years 1863 to 1866 we have at the end of the year, the sale in 1863, maturity 1868, of the face value of bonds, \$69,500, to run 5 years, the nominal rate of interest 12%, payable quarterly, and the interest amounting to \$8,340. The basis of sale par; the net proceeds of sale, after deducting expenses thus being \$69,500, as we had no record of expenses, and as the bonds were sold at par, therefore no sinking-fund is required to amortize discount or expenses, and columns 11 and 12 are empty.

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In column 13 is shown the total annual amount of interest and sinking-fund, and column 14 the actual resulting rate upon the net proceeds. In this case being 12% because the bonds were issued at par, without expense, so far as we have record. In the year 1867, \$500,000 more bonds were issued to run ten years, bearing a rate of 10% payable semi-annually; that makes then, as of the date 1867 outstanding bonds of the face value of \$569,500, the interest upon the two issues amounting to \$58,340, and the actual resulting rate being 10.23%, as against the nominal face rate of 12% on the \$69,500 of outstanding bonds, and 10% on \$500,000 of bonds outstanding. The same method of computation applies until you get down to the year 1875-1876. In 1875 there were outstanding two millions of face value bonds, bearing a nominal rate of 8.25%, an actual rate of 8.23%, the actual rate being smaller by reason of some small premiums which were paid upon certain of the bonds. In the year 1876 there were sold \$69,000 of bonds, having 30 years to run, maturity being in 1906, of face rate 6%, payable semi-annually, the amount of interest being \$4,140; the basis of sale, however, was 95. Therefore, the proceeds of the sale of the \$69,000 of bonds was \$65,550, and there had to be amortized this 5% per bond in a period of 30 years, which required a total annual payment of \$44, or 63 cents per bond, which brought the rate up to 6.39% upon these bonds, and made the average of all of the outstanding bonds for the year 1876, which amounted at the end of the year to \$2,069,000,—8.17%, substantially equal to the nominal rate of the then outstanding bonds.

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Note particularly that allowance for depreciation, and contingent liability and insurance was first made in the corporation accounting in the year 1908, and annually thereafter. As a result of this fact, in order to make comparable the resulting total rate of return upon the investment of plant here shown throughout the period of years 1866 to 1914, inclusive, there must be deducted from the rate of return shown in this tabulation for the period from 1866 to 1907, inclusive, proper annual allowance for depreciation corresponding to the amount estimated as necessary to cover the abandoned property, and the depreciation which is assumed to have accrued upon the existing property; for the period 1908 to 1914, inclusive, no such deduction is required, as it has already been covered by specific allowance therefor in the company's accounts, and by my \$60,000 contingent (future) depreciation allowance. I used the word "future" there by reason of the fact that so far as the past is concerned we know what has accrued in the way of contingent depreciation.

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Questioned by Mr. Searls.

The \$60,000 is included in the years 1907 to 1914 in this computation. It occurred to me that I might reduce those figures and show what difference it would make to exclude them; the effect upon the rate would be exceedingly small, because it is a very small percentage of the total amount.

Deduction is not to be made on account of contingent liability and insurance in as-much-as they have been met out of what would otherwise constitute net earnings, and in the case of earthquake damages by actual assessment upon the stock.

In the period from 1908 to 1914 both inclusive, in which depreciation and contingent liability allowances have been accounted, the return has averaged 4.2% as based upon the ordinance rates, and 5.2% as based upon the ordinance plus 15% rates. It is further to be borne in mind that this computation has been made independently of the record of probable original cost, and that it differs from it in that calendar years are here assumed, whereas, in computation of original cost and development expense, fiscal years of June 1 were used up to the year 1879, and calendar years thereafter. There is, however, substantial agreement in the two tables, when it is recognized that in the original cost and development expense analyses, interest charges were omitted in all cases subsequent to the consolidation of the San Francisco City Water Works and the Spring Valley Water Works in the year 1865, the record prior to the year 1866 being so incomplete as to make impossible a satisfactory analysis of the interest account, along the lines adopted for the period subsequent thereto (1866 to 1914). Prior to 1866 the interest charges were included in a contingent expense account, and they could therefore, not be accurately segregated in the records available.

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It is to be noted, however, that this analysis gives substantial confirmation of the figures contained in the "original cost and development expense".

Note, further, that in the above computations no allowance has been made for appreciation in value of any kind, which has, of course, been very substantial in this period of years, from 1866 to 1914, inclusive.

10,221 I have shown on page 14, 15 and 16, merely for completeness, brief extracts from the testimony of Mr. Lipman, Mr. Weeks, and Mr. Tourny.

INTEREST RATES ON SHORT TIME LOANS.

The interest rates paid by the company in the past upon short time loans varying generally from 30 to 90 days, with some extending over a period of 12 months or thereabouts, are without significance with reference to the cost to it of borrowing money on the basis of a permanently funded debt for the following reasons:

First: These loans have been insignificant in amount.

Second: Of short time.

Third: The loans have generally been secured by collateral, as for instance, the bonds of the company.

Fourth: In many cases the current deposits of the company with the banks have nearly equalled the amount of the loans.

Fifth: The credit conditions involved were such as to give to these loans great security and convertibility.

Sixth: With the established business of the company substantially no hazard was involved in these loans.

10,222 What I meant was that throughout this period of time there has been a substantial margin in the value of the works behind the loans. The credit of the company has never been impaired. Of course the condition that is shown in that diagram could not have prevailed for a long period of time.

Questioned by Master.

I do not regard the gold notes in the same category as the bond interest rates. I understand too that the floating debt of the company would have to be satisfied before the stockholders would be satisfied, so that their security would be greater than that of the stockholders. It would not be as great as those of the bondholders.

I would not consider the issuing of bonds at $6\frac{1}{4}\%$, at a cost of $7\frac{1}{4}\%$, as satisfactory financing for the condition of the times when these short-term notes were issued. I think it was the wise thing to do. I don't think that the company could, to advantage, have placed a long-term bond. I do not think the rates which they then paid on the short-term notes is a fair measure of bond rates for a reasonable period of years. It would undoubtedly be too high. It seemed to

me it did not shed much light, because of the very small amount. If, for instance, the company were to attempt to finance these notes within the next ten years, as I conceive they involve between \$10,000,000 and \$16,000,000 of expenditures, they could not successfully do it in that way; the rate which it would pay would be very much larger than that indicated by the small borrowings on the short time. So far as the issuance of bonds goes, we have no record at all of the issuance of bonds by this company since 1903, and there is no basis really for saying just what bond money would cost, except somebody else's opinion; that is, from the company's actual experience during these years of litigation.

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DIRECT EXAMINATION BY MR. GREENE.

Then there follow on pages 18 to 24 what perhaps has no place here, legal citations of rates bearing upon the rate of return. There is not included in that, as I meant there should be, Judge Farrington's opinion in the last rate case. These are largely court findings.

Questioned by Mr. Searls.

I can explain the very marked increase between $5\frac{1}{2}\%$ which was the nominal rate on the first issue of these gold notes, and 7.22% included. The face value of the notes sold was \$1,000,000. The discount paid to N. W. Halsey & Co. was \$20,000; miscellaneous expenses, attorneys' fees, and filing fees, etc., were \$5,707; the cost of redemption, a discount of half a percent, was \$5,000; publication notes, \$119.39, making the total cost of the issue, \$30,826.39, which left the amount realized from the sale of \$1,000,000 face value of notes \$969,173.61. The annual rate was $5\frac{1}{2}\%$, which was \$55,000. The sinking-fund, 2 years, $5\frac{1}{2}\%$ rate, in order to amortize the expenses of \$30,826.39, amounts to \$15,010 each year, making each annual payment approximately \$70,010, which, on the amount realized by the sale figures up 7.22%. These items of attorneys' fees were not included in the operating expenses.

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Referring to the question of working capital delinquencies: The delinquencies are reported at the end of the month. With reference to the metered service, this is the situation: Let us discuss, for instance, the accounts for the month of December, and the delinquencies reported as of December 31. Beginning November 25, and extending to about December 12, the meters are read upon the domestic and commercial metered service, and the bills are rendered as soon as they can be made out, five or six days later, that is, during that period from November 25 to December 12, and those metered bills constitute the December charges for water, or December metered service collections. The bills are rendered by collectors; the collectors go the rounds from the first of December to the thirtieth of December, so that the bills are not rendered on the average until about the middle of the month, and the bills are not collected until

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well after the middle of the month—some of them until after the end of the month of December. As to that class of service, the service was actually rendered virtually within the month of November.

10,229 Now, with reference to the city's service, the metered city services are read on the 20th of the month, and those bills are made out, as in the example cited, about December 25, or say covering the meter readings up to December 20, those, if not paid on December 31, would appear in the delinquencies. They are, as a matter of fact, generally paid about the middle of January covering that period up to December 20th.

Finally, we have a class of the large public utility, and other large consumers under the metered service, the meters of which are read on the 30th and 31st of the month; those actually cover service during the month of December. Those are reported in the delinquencies. Those bills are not collected until, in general, from the middle of January until the latter part of January, so that there is a lag after the reading of the meter of from 2 to 4 weeks, and after the average rendering of service of from 4 to 6 weeks. You can see how fearfully involved it is. I feel confident it is a fair statement to say, as I said after studying the question very carefully last year, that about \$80,000 is a fair delinquent account to assume as occurring every month, and as therefore being entitled to a return under the working capital. I might also say that while the flat rate service is nominally collected in advance, in fact, it is not. The December bills for December service are rendered by the collectors between December 1st and December 30th, and the collections are not made—many of them—until January, so that even they do not precede the service. So you have not as much of a fund on which to run derived from the prepayments of flat rate services as occurs in most works where they collect over the counter in the first ten or fifteen days of the month.

10,230 Mr. Searls: We have not figured it that way at all. Our intention in regard to working capital was to allow on somewhat the theory of the Railroad Commission.

(“Development Expense, Leonard Metcalf”, introduced and marked “Plaintiff's Exhibit 198”).

I have given at the beginning a summary of the analysis which have been made of development expense which are discussed in detail in the following pages of the report.

DEVELOPMENT EXPENSE—GOING CONCERN—GOING VALUE.

While it is true that a project may be ready for operation after the investigation, promotion and planning of it, the purchase of the necessary real estate and other rights, and the building of the structural plant or physical property, the final work remains to be

done,—to develop the business and profitable revenue to the company. As the merchant recognizes in commercial business that time, effort and expense are required to draw customers and build up a profitable business, so the operator of public utilities knows that a certain period of time is required to acquire a revenue, which will not only meet the operating charges of his property, but give a fair return upon its fair value. 10,231

Experience in the water works field has shown that at the time when the construction of water works was first actively undertaken a period of ten years or more was generally required to educate the public to the advantages of public water service and build up a normal revenue. As such facilities became more general the period of time required to effect such development decreased, particularly in the case of the smaller plants.

What I wanted to bring out in that first paragraph was simply this; with the growing use of water, and the knowledge of its convenience, the period required for the development of business has grown shorter than it was when we first had waterworks in this country. I do not mean by that that water is any more necessary. 10,232

Questioned by Master. 10,233

In the early periods recourse was had to wells; people were content to pump water, and to carry it up 3 or 4 floors. In Germany today you will find them carrying water up 4 or 5 stories by hand, whereas, in this country we would not tolerate it for an instant.

DIRECT EXAMINATION BY MR. GREENE.

Courts, commissions and engineers have clearly recognized these facts and given weight both to the cost of establishing the business and to the greater inherent value of going concerns, or of properties with established business, as compared with new or undeveloped undertakings.

The subject has been approached from three points of view,—first, the actual cost of developing the business so far as it can be determined; second, the estimated cost of reproducing the business; and third, from the broader legal point of view of attempting to measure the fair value of this property element, i. e., of determining the difference in value of the property with and without an attached established business, giving consideration to its original cost, its reproduction cost, and to the historic and other conditions surrounding the property under review which might throw light upon it.

While the terms “development expense”, “going concern value” and “going value” have all been used synonymously, a correcter usage is to be found in the differentiation between original and reproduction conditions.

The Original-Development-expense of a property may then be defined as the cost of building up the existing business and revenue of the 10,234

company. It is made up not only of the expenses of advertising and costs incident to inducing patronage of the service, but also of the differences in the actual revenue earned by the corporation during the early formative-period or period-of-acquisition-of-business compared with what would have constituted a fair rate of return upon the fair value of the property. This method of computation has some times been referred to as the "Wisconsin Railroad Commission Method of determining development expense." Under it there is added, to the investment costs of the property each year, the actual fair operating expenses, including repairs, taxes, depreciation allowance, and fair rate of return upon the capital-sum, and deducted, the actual gross revenue earned during the year. In this way the deficits in fair return are added each year to the capital-sum or the excess revenues are deducted from the capital-sum, the profits and losses in effect being compounded annually at the assumed fair-rate-of-return. In the application of this method the Wisconsin Railroad Commission has added to the capital-sum from year to year, or period to period, the fair increment in value of real estate and other property, under the legal requirement that the company is entitled to a fair return upon the fair value, not the cost of the property, unless the cost and value of the property under question are alike. By "property" there I mean, of course, real estate.

10,235 "Development Expense in Reproduction, or Reproduction Cost of Development Expense" should be differentiated from the original-cost-of-the-development-expense in that present rather than historic conditions should be assumed to control the development of the business. Under this method of treatment the estimator is placed in a similar position, with reference to the determination of the cost of building up the business of the company, to that under which he determines the cost of building the physical plant or structures of the property. The general method of procedure is identical, the estimator requiring, in the determination of the development expense, a knowledge of operating conditions and experience in dealing with the financial side of such public utilities, in the same way that experience is required in the field of construction for the estimator of the fair cost of building the physical plant. The details of the application of this method have been outlined fully by Metcalf and Alvord in a professional paper presented before the American Society of Civil Engineers, in which the method is referred to as the "comparative method." Under the application of this method the investor-builder is assumed, as of the date of valuation, to be in the position of being able either to acquire the existing property with its established business and revenue, or to build in the community under question a new plant identical with the old, but under the assumption that no plant exists there, and to acquire the business of the community as rapidly as he might be able to develop it under

such conditions. The difference in the sum of the present worths of the existing property and of the new or operative property, during the period of years assumed to be necessary for the acquisition of the business of the community to the level of the old, is then the reproduction cost of the development-expense.

The "Going Concern Value or Going Value" of the property may be defined as the difference in value of the existing plant with its established business as compared with the identical plant ready for business, but without established connections, business or revenue. This has, perhaps, been the usual legal conception.

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While these several terms have been used interchangeably or synonymously, it is necessary to bear in mind the distinction between original or historical and present conditions, and between cost and value.

It will be seen that the last mentioned conception of going value is a somewhat broader one than that covered by the definition of the development expense under original, or under reproduction conditions, as of the date of valuation. It is clear, too, that it recognizes the fact that a plant with a well established business is more valuable than an identical plant without such business, even though the original development expense or estimated amount of the cost of reproducing the business may have been amortized in the past life of the utility by excessive profits at some past period.

Development expense is independent of franchise value except in so far as it assumes that the property is an existing operating property or one capable of being continued in operation. Even though the franchise may have expired, the property with its established business is recognized as being more valuable and capable of earning a greater return than if such business had not been previously developed.

Under the broadest treatment of development expense, as being the difference in value between the physical property without attached business and the going plant, it has covered in the past awards, made by courts and commissions, franchise rights and other intangible values, but in many, if not most of these awards, the value attributed to these intangibles has probably been a nominal one. In any event it has been merged in that of development expense or going concern value, thus defined and determined.

As has been stated heretofore by the courts, development expense or going concern value is not the "difference between the reproduction cost and the junk value of the property," but is in the nature of an addition to the value of the physical property. Neither is it "good-will", for which no allowance is generally made in public utility properties,—beyond such general consideration as it may receive in the review of the revenue and the operating conditions of the utility.

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Methods for Determining Development Expense or Going Value. The following general methods have found wide application in water works valuation:

1. Rule of Thumb Methods:
 - (a) Percent of Gross Reproduction Cost.
 - (b) Percent of Gross Annual Revenue.
2. Development Expense under Past or Historic Conditions:
 - (a) The Wisconsin Railroad Commission method, with depreciation figured on sinking-fund-basis.

That is perhaps a little misleading, as I see it now. By the statement, "with depreciation figured on sinking-fund basis", I mean taking a percentage annually of the structural cost of the property. One percent has generally been used by the Wisconsin Railroad Commission for the Wisconsin conditions. It becomes, in a sense, a sinking-fund method, by reason of the fact that if there is a deficit in return, including the depreciation as an operating expense, then the deficit is carried into the capital sum, and the fair rate of return is thereafter figured upon it, so that there is a compounding effect upon that; if, on the other hand, there is an excess of earnings, then there is no compounding effect.

3. Going Concern Cost, the cost of reproducing the business or the development-expense, under present conditions, as determined by the so-called "Comparative Method".

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4. Precedent in court decisions and commission rulings.

5. Assessed Valuation of franchise and going concern value as a basis for taxation.

Taking these up now one after another, we have:

1. RULE OF THUMB METHODS.

(a) Percent of Gross Reproduction Cost.

The experience in the valuation of water works properties in the United States has indicated that the development expense or going concern element of value generally lies between 10% and 15% of the gross reproduction cost of the property, sometimes reaching upwards of 20%, rarely being less than 10%.

Questioned by Mr. Searls.

In speaking there of "the experience", I mean my experience, and those men who have given particular study to this subject. What I am stating indirectly here is that in the opinion of men who value waterworks, and that is indicated by such of the decisions by Commissions and Courts as can be analyzed in such a way as to segregate the going concern allowance, or development expense allowance, in the entire valuation of the property.

Questioned by Master.

What I might also imply would be that taking my experience, and the showing of findings that have been made elsewhere, and com-

paring them with the capital valuations, I reached certain percentages which found the basis of a rule of thumb method such as I here speak of. Assuming that my valuation of this property that we are concerned with now is \$40,000,000; I reach a certain result as to what I think should be going value, and in a future case, looking back on this, I would take the percentage of that and apply it, and compare it with numerous others of my own and other persons, and thus reach a statement something like this, with this limitation, perhaps, that where the final award is less than my valuation, that fact is taken into consideration.

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The Gross reproduction cost of the structures is estimated at the approximate sum of \$25,126,000.

I might say that these figures were used last November, and there may be some slight modification in the thousands of dollars, but it would not have any effect upon the percentage; the precision of the method did not warrant revision of all these figures to accord with the latest figures of Mr. Hazen's.

The fair market value of the lands, with an allowance of 3% overhead charges and 12% interest-during-construction allowance is estimated at the approximate sum of \$22,003,000.

The total Gross Reproduction cost of land and structures is therefore estimated at the approximate sum of \$47,129,000.

The Original Cost, excluding overhead or development expense, but including an allowance of six months' interest upon the expenditures is estimated at the approximate sum of \$30,872,000.

I believe that appears in my Table 12-BB, unless the figures have been modified since that time. It is based primarily upon the same original cost figures which were used in Exhibit 170, Table A. In that exhibit were given the original cost of lands and structures, excluding overhead and interest-during-construction, amounting in the aggregate to \$29,840,887 as of the year ending December 31, 1913; adding overhead allowance of 2% on lands, and 10% on structures, it gives \$32,096,799, and that allowance covered a period of one year's interest. In this case here, in figuring the development expense, we have included only 6 months' interest upon the theory that the rest of the interest is taken care of the year following in the allowance of fair return upon the capital account, which makes the total original cost of the lands and structures something less, —\$30,872,000.

DIRECT EXAMINATION BY MR. GREENE.

The fair value of the property as a basis for rating is estimated at the approximate sum of \$43,500,000, including in it the allowance for development expense.

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That is the first time that figure has been mentioned, and that is the rating base which I have assumed for the year 1913, including the development expense in the rating case.

It is to be noted that the land values in these works probably constitute 40% more or less of the value of the property, whereas, in the water works in the portions of the United States lying outside of the semi-arid belt, or belt of deficient rainfall, generally constitute less than 10%. This would tend to increase the development expense by reason of the increase in the cost of carrying the lands during the period necessary for the construction of the physical plant. On the other hand, the rate of acquisition of the business in such a region would be somewhat more than in the region of abundant rainfall, which would tend to decrease the amount of development expense.

In the following tabulation is given the development expense under reproduction cost conditions, corresponding to different assumed bases and rates.

10,242 It will be seen that a development expense of approximately \$3,500,000, for instance, would correspond to 14% on a valuation of \$25,000,000; 12% on a valuation of \$30,000,000; 10% on a valuation of \$35,000,000. I will say that I have assumed a development expense of \$3,400,000 as the result of these studies, which, on a basis of valuation of \$30,000,000 would be between 11% and 12%, and on a basis of \$35,000,000 would be something less than 10%.

In Terms of Gross Annual Revenue, development expense is found to be approximately equal to one year's gross annual revenue, as of the date of valuation, in the case of ordinary water works properties of medium and small size, and between 1 and 1¼ times the gross annual revenue in the case of the larger properties,—the cumulative interest-during-construction charges incident to the long period of construction involved in the building of the larger works being accountable for the difference.

The gross annual revenue for the year ending December 31, 1913, upon the ordinance-rates-plus-15% was \$3,361,969, of which amount the sum of \$361,306 represented the excess collected over the ordinance rates. The average gross revenue (including the 15% excess) collected during the period of years from 1907 to 1914, both inclusive, was approximately \$2,842,800.

The going concern value, in terms of the gross annual revenue as of the year 1913, is shown below under different assumptions.

Ratio to Gross Annual Revenue	Going Concern Value
1	\$3,361,969
1⅛	3,782,000
1¼	4,202,000

Questioned by Mr. Searls.

I have based all of my discussions upon the inclusion of the 15% earned, simply to show what was earned on that basis, and on the

theory that even if larger earnings did not show a fair return, if the discussion were based upon the enjoined ordinance rates, the returns would have been still less. Perhaps it would have been more logical to adopt the other procedure. If I assume I have the 15%, on this rule of thumb method, I increase my going concern accordingly.

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DEVELOPMENT EXPENSE UNDER ORIGINAL CONDITIONS.

(a) The Wisconsin Railroad Commission Method:

The method of determining development expense under original conditions, often referred to as the Wisconsin Railroad Commission method, is applied in the following way. To the original cost of the property upon its completion at the end of the year there is added the cost of the new construction built during the year, with overhead and other incidental costs included; the operating expenses including repairs and taxes; a reasonable depreciation allowance, which the Wisconsin Railroad Commission has usually estimated upon its water works properties at 1%, or thereabouts, of the cost or reproduction cost of the physical structures; and an allowance for fair rate of return, including interest and profit. From the sum, thus made up, is subtracted the actual gross revenue earned during the year, leaving what could be called the total capital sum at the end of the year. Annually thereafter a similar course is pursued, there being added each year to the capital sum, the difference between the actual revenue earned and the operating expenses, plus repairs, taxes, depreciation allowance and fair return upon the previous capital sum,—the sum of the deficits in earnings below the assumed fair rate of return thus constituting the development cost, any excess earnings above the estimated fair rate of return being deducted and serving to decrease the development cost to date.

Under this method of treatment, therefore, the development cost is determined essentially by the loss in fair return suffered by the property, as based upon the cost of its property with the important modification, however, that the Wisconsin Railroad Commission adds annually or periodically to the cost of the property any appreciation in value that may have occurred. The method is unfair in application, and may lead to absurd results, in the case of properties which have been very successful financially, in that the excess in earnings over the estimated fair rate of return may wipe out the deficits, or even amount to a sum in excess of the deficits in revenue incurred during the early years of the formative period in the life history of the property, making the successful property in theory less valuable than the unsuccessful one, the deficits in earnings of which have exceeded the excesses in earnings. Similarly, in the extreme case of an unprofitable venture which inherently could not earn an adequate return even under conditions where earnings of the corporation were

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in no wise limited by the rulings of courts or commissions but purely by commercial considerations, the development expense under this method of treatment may reach enormous figures and lead to the absurd conclusion that the property which has suffered constantly the biggest deficits in revenue is more valuable than that which has earned adequate or excessive returns.

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It is clear that the rate allowed for depreciation must vary under different conditions and that it should be such as to amortize not only the loss from depreciation upon the existing plant, but also to retire the abandoned property as it is abandoned.

Computations have been made on the development expense of the Spring Valley Water Company property under past or historic conditions on the Wisconsin Railroad Commission basis, with an assumed appreciation in property values of 2% annually on the land costs. These computations were based upon the original cost records, excluding all allowance for overhead expenses, the record of which was fragmentary, and were based upon the following further assumptions:

1: Six months' interest-during-construction added to original cost at Metcalf's "Fair Cost of Money to the Spring Valley Water Company", it being assumed that the remainder of the interest-during-construction cost allowance will be covered by the fair rate of return, and that therefore there is to be accounted here under the cost of the year only six months' interest upon the investment during the year under question.

2: 2% annual appreciation allowance upon land costs.

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I took that as being conservative, and as giving about \$5,000,000 appreciation upon the land values amounting to about \$9,000,000—on Table A, "Exhibit 170", the original cost of the lands, excluding overhead and interest-during-construction, amount to \$9,232,000, and I wanted to take a figure which was between the figure of our own witnesses, and the City's witnesses on the fair value of the lands of today. I would have taken, if I could have had it, the court's finding on the value of these lands. Of course, if I had taken the land values of our own witnesses only as of the year 1913, I should have had to have taken a higher return of appreciation than 2%, because our own land values, without overhead and interest-during-construction, amounted to something over \$18,000,000.

Questioned by Mr. Dillman.

It is in this sense, that I wanted to reach as of 1913 the fair value of the land, the original cost having been about \$9,000,000. The Wisconsin Commission, in applying its method, adds the appreciation in value of the land from time to time. Now, the values placed by our witnesses upon the lands amounts to something over \$18,000,000 as of the year 1913, and the witnesses of the City are about as far below the figures which I have taken as the valuation of our

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experts is above the figure which I have taken, and this results in giving a total increase of about \$5,000,000—\$4,628,000 appreciation in land values between the time of purchase and the year 1913. The 2% was a result, and not a premise, in the computation. I made a guess, as a matter of fact, that 2% might land me about there, after making some rough computations, and I did not change it finally, because the final figure was about midway between the experts of the City and our own experts on the lands.

Questioned by Mr. Searls.

That is a compounded percentage in the sense that it is added into the capital sum; if there is a deficit, it is compounded; if there is an excess, it is also compounded and deducted. I added 2% annually to the value of the land.

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3: Deduction from the cumulative original costs of lands and structures of the abandoned or never-used lands and structures.

Note that this involved an allowance for the deficiency in earnings annually during the first 11 years shown, growing out of the fact that the abandoned property exceeded the depreciation allowance during this period of years. Thereafter the amount of the accrued depreciation allowance being sufficient to take care of the abandonments as they occurred, no further deduction had to be applied.

4: Annual depreciation (figured as a percentage of structural investment) allowance of 1.45% based always upon the existing structures. This rate accumulated in the period of years under question, an accrued depreciation allowance corresponding to the structures abandoned \$2,911,000; structures never-in-use, \$360,000; and the depreciation upon existing structures, \$3,496,000; totaling \$6,-767,000.

The amount of the depreciation allowances to December 31, 1913, was \$6,788,000 as figured on the 1.45%. It should have been \$6,767,-000, but the difference did not justify the labor of recomputation, being well within the limits of the accuracy of the hypothesis upon which the total is based.

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Under these assumptions, the appreciation upon the lands in use during the period from 1865 to 1913 is found to be \$4,628,000; the cumulative investment or capital sum \$36,830,000; the development expense \$5,953,000, and the fair gross annual revenue for the year ending December 31, 1913, \$3,656,000 (the actual revenue having been \$3,368,697, or approximately 10% less).

The detailed computations upon which this is based are shown in table 9, the last table of this exhibit. In column 1 we have the years beginning with 1865 and ending with the year 1913, practically. In columns 2 to 5 the original cost of lands and structures, excluding overhead, but including interest-during-construction for a 6-months' period, figured at my cost of money to the Spring Valley Water Co.

It will be noted further that the original cost of the structures has been decreased by abandonments, or never-used lands and structures, that is, the original cost of lands and structures has been decreased by abandonments and never-used lands and structures. The lands abandoned, amounting to \$247,371, the lands never used \$1,267,358, making a total of \$1,514,729; the structures abandoned amount to \$2,910,721, the structures never in use \$360,410, and the depreciation upon existing structures \$3,496,000, the total to December 31, 1913, upon the structures, being \$6,767,131.

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In the second column is shown the annual amount. In the third column the interest; in the fourth column the total of columns 2 and 3 the annual investment in lands and structures plus interest; in the fifth column the cumulative amounts to date. In columns 6 to 9 we have the original cost of the lands, decreased by abandonments and never-used lands, excluding allowances for overhead, but including interest-during-construction allowance for 6 months period. In column 6 the annual amount; column 7 the interest; column 8 the total; column 9 the cumulative amount; the reason for inserting these columns 6 to 9 being that it is necessary to determine the structural investment in order to determine the depreciation allowance; by getting the difference between the two, that is, the difference between the original cost of lands and structures shown in columns 2 to 5, and the original cost of the lands alone, shown in columns 6 to 9, we get the results shown in columns 10 to 13, covering the original cost of structures, excluding overhead, but including 6 months interest-during-construction at my fair cost of money to the Spring Valley Water Co. In column 14 is shown the depreciation found annually by applying the rate 1.45%, which rate is such as to yield a total amount in this period of years sufficient to provide for the abandoned structures, the structures never in use, and the depreciation upon the existing structures.

Questioned by Mr. Searls.

10,250 I provide for the retirement of structures never in use by taking it out of original cost.

Mr. Sharon: Most of it, as I remember, was for test wells at the head waters, and I think the Ravenswood Wells were included in that, and the Searsville Dam was included. The amount was \$360,000.

10,251 Mr. Metcalf: In column 15 are shown the operating expenses and taxes, and those operating expenses have not been modified by the deductions which I have made recently from the accounts and the exhibits submitted by Mr. Muhlner in accordance with the discussion which we had upon operating expenses; the difference is not material, however, and it would not have a substantial effect on this computation. In columns 16 and 17 are given the assumed fair return upon the cumulative investments; that is, in column 16 is shown the rate which was taken from my fair cost of money to the Spring

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Valley Water Co., multiplied by the capital sum shown in column 26 of this exhibit, which is made up of the original cost of lands and structures, increased by the deficits in revenue, or decreased by the excesses in earnings during this period of years. In column 18 appears the correction for the interest addition for the deficit due to the abandoned or never-used structures which occurred in the early life history of the plant before under this method of computation, the property could have accumulated a sufficiently large depreciation fund to take care of the abandonments; rather than to use a variable rate larger at the beginning of the time, when of course they could not have borne it, larger than 1.45%, and a somewhat smaller rate during the latter part of the period, I simply assumed a uniform rate of 1.45% for depreciation, and made this correction for the deficit which had to be carried forward growing out of that fact. In column 19 is shown the combined fair return, operating expenses, taxes, depreciation, and the correction for interest shown in column 18, growing out of the deficits in the accrued depreciation fund, as compared with actual abandonment during early years of operation of the property.

In column 20 are given the actual receipts; during the latter part of the time that is covered by these rate suits, being the earnings at the ordinance rates, plus 15%. In columns 21 and 22 are given the deficits or surplus in rates during the year, as compared with the actual receipts, as compared with the combined fair return; that is the difference between the actual receipts shown in columns 20 and 19, the proper receipts on the assumed hypothesis. If I used the ordinance rates for those latter years in column 20, it would increase the deficit and so increase the development expense.

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Questioned by Mr. Searls.

It would add about \$2,000,000 to my deficits, and subtract it from the revenue; the compounding effect would have to be taken into consideration; it would add something more than that.

DIRECT EXAMINATION BY MR. GREENE.

In column 23 is shown the cumulative excess or deficiency, the excesses being marked with a plus sign, and the deficiencies with a minus sign. In columns 24 and 25 are shown respectively the annual and accumulative appreciation in land values figured at 2% of the original cost, and figured year by year. In column 26 is shown accumulative investment of capital sum year by year, being made of columns 5 plus 23 plus 25; that is the original cost of lands and structures, plus accumulative excess or deficiency in receipts, plus the appreciation in land values.

Questioned by Mr. Searls.

I understand that the Wisconsin Commission treated it just as I have treated it here. I have added or subtracted interest according

10,253 as there was a net deficit or excess; in other words, the deficit or the excess is carried each year into the capital sum. If the earnings are excessive, it would wipe them out, and then the interest would run against the property; if there continues to be a deficiency, the interest on that deficiency would be added in. I have allowed interest on the deficits, and interest on the excesses, prior to 1907. I have not taken my computation as of 1907, but I have taken it from the year 1865, because it is an original cost calculation.

10,254 Columns 21 and 22 gives you a deficit or a surplus, and that is obtained by subtracting actual receipts from what I estimate as the fair rate of gross return. I get the second year a deficit of \$70,495, and I add that to the \$1,375,000 in my column 23, and the interest for one year there is added to the cumulative investment or capital sum shown in column 26, and the fair rate of return would be figured on the combined sum during the next year, so that you would be adding interest. It is the succeeding year which will show the application of the interest in each case. The interest on the deficit is carried along in column 16.

The Master. Q. Make the supposition that you can determine the original cost of a plant in just the way you have done, and that you include in that original cost these deficits or surpluses, as they historically accrue, and that your cumulative excess or deficiency in receipts may thus be determined, just as you have done, and the final sum would be on that strict original cost theory, which you have denominated development expense, a figure of approximately \$5,953,000; now, that is all you need if you are talking about original cost, but as I understand, the Wisconsin Commission method simply tacks on these last three columns shown on this page in an effort to translate cost into present value by the addition of a percentage of land values.

A. I think that is true, your Honor.

10,255 Mr. Metcalf: I cannot say definitely that they have added a percentage on the structural value; I think they have borne it in mind, but I don't know of a specific instance in which they have done it; they have referred to it specifically with reference to the land values, however, but so far as determining this item of development expense of going concern, the increase in cost shown in these last three columns here is unnecessary. The Wisconsin Commission would say on my showing here, if they agreed with it, that the development expense was \$5,953,000. I do not mean to deny them the opportunity of review in other ways, and finding a different value, but they would say this computation gives the result. If we were to suppose that some other commission just cuts this sheet off here after column 23, and did not include the appreciation in land values, under these circumstances it would get a smaller development expense, which in this case I should think might well be negative. The 2% appreciation in

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the columns 24 and 25 is added into the capital sum each year; it was put in that relative position simply as a matter of convenience from some other computations which have been made, but it is included in the capital sum.

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Questioned by Mr. Searls.

I have accounted for accrued depreciation on structures, because this allowance gives you a total amount which will cover not only abandoned structures, but also the depreciation upon existing structures to the extent of \$3,496,000. This table headed "Original cost of structures" excludes each year the structures which were abandoned or went out of use. We have actually deducted these year by year in accordance with the schedules previously submitted. The first computations that I made were based upon the other assumption that we carried the structures through to the end of the time, and some of the results we got were, I think, something over \$20,000,000 for the development expense on that basis.

Questioned by Mr. Greene.

The compounding effect is so large; and a little further on in this report I showed you the effect of the compounding from the earliest period, that is, in the early sixties the compounding effect on these rates is to multiply investment something like 43 times; that is, a million dollars then invested, a deficit of that amount would become \$43,000,000; of course for a shorter period of time you would have a less factor. It only shows, as I think, that you cannot apply this method in this way, going back for so long a period of years, and get a result which commands confidence. I have made the computation, your Honor, because it is one of the methods which has been used by commissions and engineers, and I think in the letter which you wrote to us that you asked that development expense should be figured on the different methods, just as in the case of depreciation. I do not, myself, attach great importance to this; that is shown in part by the amount which I finally assumed, \$3,400,000, as against this computation of about \$6,000,000, and also because of the tremendous difference that slight variations in your assumptions make in the final result.

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Questioned by Mr. Searls.

I have deducted structures which were abandoned and went out of use, and have taken account of accrued depreciation on existing structures in use to the extent of \$3,496,000. That is not subtracted before I reach the total shown. The annual depreciation allowance will provide a fund which is sufficient to amortize the structure as it goes out of use, and take care of the existing structures; this would presuppose a fund as theoretically in hand of \$3,496,000, or thereabouts. The Wisconsin Commission has not been in the habit of making the computation on the basis of deducting accrued depreciation on existing structures before reaching the capital sum. If you allow

10,258 depreciation in structural value, that would increase the annual rate which you would have to allow in order to give you a fund sufficient at the end of the period to take care of the accrued depreciation upon the existing property, because each year you would be figuring your depreciation for the year upon an amount smaller by the deduction which you had previously made for the depreciation; in other words, it is the same sort of difference that you get in the depreciation allowance as figured on the equal annual payment method where you actually deduct it as compared with the sinking-fund method where you assume that it goes into a sinking fund to draw interest instead of being deducted each year from the capital sum. You can use either method.

For the purpose of this table you get the same result. I have shown that comparison in my depreciation discussion in the sinking fund application and the equal annual payment method; under the former the amount of the depreciation being figured on the gross reproduction cost, and under the latter upon the net reproduction cost, or depreciated reproduction cost.

Questioned by Mr. Searls.

10,259 This percentage of 1.45% is higher than some of the percentages that I have used previously in my depreciation discussion, and it is lower than one of the others; one of the others was 1.65%. It depends entirely on the basis which you assume as to whether you deduct depreciation or not, and as to whether you figure it on the straight-line method or on the sinking-fund method, or the equal annual payment method. In my depreciation discussion I did not have to take care of the structures which had actually been abandoned in the past.

Questioned by Master.

I was taking care of a total of \$3,500,000, roughly, as against \$6,700,000, and that would make a difference in the rates of about one-half. You might have a table which talks of nothing but costs, and does not figure in any appreciation in the land values. The result of it would be that you would get a development expense which would be much smaller than this, and which it is possible might be negative; in other words, for more than amortizing the deficit. What that would mean practically is this: That you had in effect earned upon the original cost, without appreciation, a rate of return which was greater than that assumed by you as being fair; in other words, in this case, as applied to these figures, it would mean that the company on the original cost, without appreciation in land values, had earned somewhat more than my estimate of fair cost of money to the corporation.

In commenting upon this result it may fairly be said that as a result, first, of the methods of accounting which were much cruder thirty or forty years ago than today, and of the fact that no man can pass with certainty today upon the exact nature and propriety of the

expenditures made during the earlier years of the period in question; and, second, the great effect of the compounding of interest upon the annual deficits or excesses over a long period of years, the results obtained are at the best to be considered merely as interesting side lights and as aids to the judgment.

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The effect of compounding is clearly shown by the following, "Diagram Showing Effect of the Compounding of Excesses, Profits or Losses of Any Year up to December 31, 1913, at a Rate Corresponding to the Fair Cost of Money to the Spring Valley Water Company, Leonard Metcalf, November 8, 1915," the compounded rates being brought forward annually from the years 1865 to 1913, the Fair Cost of Money decreasing from $12\frac{1}{2}\%$ in the year 1866 to 6% in the year 1912 and thereafter. This diagram shows that deficits incurred in the year 1865 would now amount at the estimated Fair Cost of Money to this corporation to 37.6 times their original amounts; similarly, those incurred in the year 1870, 21.4 times; 1880, 8.3 times; 1890, 3.9 times; 1900, 2.1 times, and in the year 1910, 1.2 times. Moreover, it is clear that the effect of any variation in the rates of interest during the earlier years of the period is greatly magnified by the end of the period by the effect of the compounding and that the factors, and hence values here reached, would be greatly magnified had there been added to the Fair Cost of Money to this corporation an allowance for profit in excess of cost.

I am emphasizing there the fact that the rates that I have assumed in this computation are my fair cost of money, and I end my computation there without going further to ascertain a reasonable profit over that. An increase in those rates would have had a very large effect upon the development expense, but I was dealing with original cost conditions, and so took the cost of the money as I believed it to be. The curve and the tabulation on page 8 show this compounding effect. In this computation I assumed in my dividend rate the fair cost of money, also; that is, what would have been a fair rate of return as against which I placed the return from dividends.

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ONE HUNDRED AND FORTIETH HEARING.

APRIL 19, 1916.

Witness: LEONARD METCALF for Plaintiff.

(Referring to Exhibit 185: The headings of the column as it reads now—according to statement of Counsel for Defendants—show that Mr. Bailhache has charged in not only undivided profits, but the total of the depreciation fund from 1908 to 1914, and the undivided profits should be deducted. He also states that if Mr. Metcalf deducts the \$1,800,000 which the company set aside as a bookkeeping

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allowance, it leaves between \$300,000 and \$400,000 which are unaccounted for, and which are distributed over the 7 or 8 years in litigation. Mr. Metcalf stated that that was in accord with the annual report of the President, which shows an accumulated surplus of \$448,000 as of the year 1915, and that he had taken that surplus into account in his discussion of the fair cost of money.)

10,263-65 (The question of the allowance of legal expenses incident to the rate suits in operating expense was discussed by the Master, with the suggestion that any advice that could be given by Mr. Metcalf or other skilled accountants would be in order to be received by the court.)

Questioned by Master.

Mr. Metcalf: In corporation accounting it is not always the case for the expenditures to be accounted and charged into the accounts in the year in which they are made. In some cases matters are held in suspense and distributed over a period of years in the future, although they could not be considered back.

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10,266-68 (Here ensued further discussion among Counsel and the Master in relation to the question of allowance of legal expenses incident to the rate suits in operating expense.)

10,269 Witness: LEONARD METCALF for Plaintiff.

Metcalf DIRECT EXAMINATION BY MR. GREENE.

The development expense under past or historic conditions, outlined above, is to be associated logically with original cost and not with reproduction cost.

The development expense under present conditions which has been generally referred to heretofore as "Going Concern Cost", "Going Value", or "cost of reproducing the business" has generally been figured under the so-called "comparative method". In principle it is similar to the determination of the reproduction cost of the property, the estimator placing himself in the mental attitude of determining the necessary steps which would have to be taken and the cost which would be involved in the development of the business of the company.

Comparison is made between the revenue to be derived from the existing plant in the light of its past history, with that of a new plant assumed to be built immediately thereafter similar to the old plant, and to acquire the business of the community as rapidly as reasonably possible were no plant in existence on the date of valuation.

Under this method of treatment the development expense is equal to the difference between the sum of the present worth of the net revenues of the existing property and of the new or comparative plant during the period of years assumed to be necessary for the new plant to develop business to the level of the existing plant.

The method has heretofore been generally applied to a comparison of the actual earnings of the old plant with the new or comparative plant. A modification of this method was developed simultaneously and quite independently by Mr. Hammond V. Hayes and by myself following out suggestions made to him by William B. Hodges, Esq., of Denver, under which the comparison is not made with the actual return anticipated for the existing plant as based upon observed past conditions, but upon what the court may find to be the fair return for the old plant.

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The computations have been made in this instance along the latter line in order to meet the legal objection that under the former practice the discussion was based upon the assumption that the existing rates were fair,—the rates themselves being under judicial review and the reasoning thus apparently in a circle.

Assumptions have been made as to the period required for the preliminary investigations, subsequent design and construction of the plant, and for the period and rate of acquisition of business.

A Period of Investigation of between one and two years has been assumed as necessary to make plans for the construction of the works, prepare specifications, purchase the lands, etc., but this period is included with the construction period referred to below.

A Six Years' Period of Construction is assumed to be necessary for the preliminary investigation, design and construction of the property of the Spring Valley Water Company, running from January 1, 1914, to December 31, 1919. In comparison with this assumption as to the period of construction necessary to reproduce these works, the following tabulation showing the actual time required to build different water works may be of interest.

The table which appears on page 10-a gives data concerning New York Waterworks, Boston Waterworks, Los Angeles Aqueduct, the New Orleans Waterworks, recently built, the recent extension of the Cincinnati, Ohio Waterworks, Syracuse, Columbus, and New Bedford, some of the more important pieces of waterworks construction which have been undertaken in this country within the last decade.

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This was obtained from the official reports of the water department of the various cities stated. The approximate cost of the work involved is indicated with the period of years involved in the preliminary investigation, and in the construction. With reference to the New Orleans Waterworks construction, the works having been completed in the year 1913, the approximate cost of which was \$12,000,000, the actual preliminary investigation period was five years. I have assumed, however, a two-year period, for the reason that these investigations were carried along collaterally with the work being done by the board in the drainage of the city on the building of sewers, upon the theory that if the work of the board had been limited solely to

waterworks construction, the period of investigation would have been reduced. I did not make any deduction from that Los Angeles figure for the time their force was shut down. I took the actual over-all figures, considering that as part of the actual experience.

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Period of Acquisition of Business. It is assumed that portions of the property will be put into operation before the entire completion of the plant; that operating expenses will be incurred in the year 1916 and that revenue will be earned on and after the year 1917, though the entire construction of the plant is not assumed to be completed until December 31, 1919. It is assumed further that the comparative plant will acquire a business commensurate with that of the existing plant in the year 1922, or in a period of six years, three years of which overlap the reconstruction period.

The Total Period thus involved in the reproduction of the property and acquisition of its business is assumed to be nine years, from December 31, 1913, to December 31, 1922.

As bearing upon the rate of acquisition of revenue it is assumed that at the end of the first year of operation, 1917, the plant will have acquired 35% of the revenue of the existing plant; of the second year, 60%; of the third, 77%; of the fourth, 87%; of the fifth, 95%; of the sixth, 98% and at the end of the seventh year, 100%.

Questioned by Mr. Searls.

That is based upon judgment, and I give in the following pages a discussion of the actual experience at New Orleans recently for comparison, which is the only case of magnitude that I know of that has occurred in this country in late years.

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Questioned by Mr. Greene.

The discussion at the top of page 11 is in conformity with my discussion on interest-during-construction given earlier in this hearing.

It is assumed that the operating expenses of the new or comparative plant will be 15% of those of the existing plant on the first year before revenue acquisition (1916), 50% on the first year of revenue acquisition, 75% on the second, 90% on the third, 97% on the fourth, 98% on the fifth, and 100% on the sixth.

New Orleans, La., Experience Compared. In this connection it is of interest to note the experience of the City of New Orleans in building up the business of its municipal water plant which was built there about a decade ago.

The city had previously been supplied in a very limited way by a small waterworks plant furnishing water and service of very inferior quality. In 1899 the Commission, which subsequently built the water, sewerage and drainage works, was organized.

An actual period of investigation of five years, from November, 1899, when the Commission was organized, to early in 1905, was consumed in studying the water problem. This period could, however,

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probably have been reduced to approximately two years had the work of the Commission been limited to the water problem.

An actual construction period of five years, from early in 1905, to December 31, 1909, was required to build the works (which cost approximately \$10,000,000 without allowance for development expense) the construction work being actively and advantageously executed.

Operation began in February, 1909, four years after the beginning of construction, one year before the completion of construction.

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Six full years of operation were required to establish the normal business of the plant,—from January 1, 1909, to December 31, 1914.

Questioned by Mr. Greene.

The best criterion of the normal business of the plant is what has been called by the Wisconsin Commission the saturation of the territory; in other words, the number of persons per tap; also the earnings per capita furnished some guide.

Questioned by Mr. Searls.

It was a private water company—a very small affair—that owned the sources which previously had been supplying the city with water. They paid something like \$300,000 for those works, which supplied only a very limited portion of the city. The city did not virtually have to get this business away from a competitor. In the first place, the old company supplies a very small fraction of the city, and in the second place the citizens were very generally supplied with cisterns, and preferred the soft cistern water, and finally, the character of the service rendered by the old company was so poor—and with the character of water as compared with the clear filtered water—that there was not any question of that sort, as the consumers obviously preferred the better supply; as a matter of fact, the old company went out of business.

Questioned by Mr. Dillman.

They were subsequently bought out by the Commission.

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The actual total period involved from the confirmation of the members of the Commission to the establishment of normal business conditions and a reasonable saturation served by these works was sixteen years, from November, 1899, to December 31, 1914. The corresponding necessary active period might perhaps have been reduced to thirteen years had the board not also been charged, and the city been confronted, with the necessity of building also the sewerage and drainage works.

The rate of acquisition of taps or services connected with the pipes, based upon the record for the year 1914, when the territory was first saturated, with correction for differences in population on the different years, was approximately 27%, 44%, 58%, 74%, 90% and 100% respectively in the first six years of operation.

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The acquisition of actual gross revenue in percent, on the 1914 record was 23%, 65%, 82%, 81%, 86% and 100% respectively, and with allowance of \$40 annual rental per hydrant (the hydrant service being in fact furnished free to the city) 44%, 73%, 85%, 90% and 100% respectively upon the first six years of operation required to establish the business. It is to be noted, however, that the rate schedule was reduced upon January 1, 1912. Had the original rate continued the resulting percentages cited above would have been substantially reduced, and had they been raised to furnish a six per cent. fair rate of return upon the fair cost of the property as of the year 1914 the actual gross revenue earned upon the four years of operation prior to the reduction in rates would have been 27%, 44%, 51% and 75% respectively.

The operating expenses, on the other hand, of the six years involved in the establishment of the business, amounted to 50% upon the first year and 100% upon the succeeding five years, of the operating expenses for the year 1914 when the business was first established.

The gross revenue has never been developed to meet the operating costs and fixed charges upon the property, though it has been assumed in the above discussion that it could have been made so by the year 1914 had the city adopted such a business policy.

The going concern value, or the cost of producing the established business of the New Orleans water works is estimated by the comparative method to be approximately 15% of the cost of the physical property upon an assumed 6% fair rate of return, and about 22% upon a 7% fair rate of return.

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While the parallel is, of course, not complete, the experience of the city of New Orleans upon the cost of developing its water business is the most significant which is available in the United States. While many, if not most of the householders in New Orleans were provided with cisterns at the time of construction of the works and the rainfall of the region is substantially higher and better distributed than that of California, which would tend to lengthen the development period, it is to be remembered that the construction of the works followed a serious epidemic of yellow fever and that the Commission was authorized to enforce connection with the new water supply after a period of years which appeared reasonable in its judgment, actually did urge and then force connection with, the new city mains, which would tend to reduce the development period.

By contrast with the New Orleans experience, the assumptions made in figuring the development expense for the Spring Valley Water Company property are believed to be conservative.

Comparison between these assumptions is shown in some detail in the following tabulations:

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The following data was obtained by me from J. B. Lippincott, or his assistants, concerning the time required to build the Los Angeles Aqueduct, which throws some light upon the problem of the time required to build large works and resulting interest-during-construction and development cost.

Although this project was pushed with the utmost vigor and was built at a time—as stated to me by Mulholland and Lippincott—when labor and materials could be had under most advantageous conditions and prices owing to the general business depression which existed during its construction, there were required the following periods for—

1. Preliminary investigation1 year.
2. Construction period required from beginning of construction undertaken to comply with the city's filings and rights (August, 1905), to the date of formal opening of the aqueduct (November 5, 1913)8 years.
3. To completion of pipe line which made the supply available to the city distribution system9 years.

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The total cost involved being approximately \$25,000,000 without allowance for interest-during-construction charges.

The development expense of the Los Angeles works cannot be figured on account of the lack of data on the one hand and the unusual conditions there prevailing on the other.

In this connection it is to be remembered, too, that the distribution pipe system is practically paid for by a frontage tax upon the property owners, so that the carrying charges do not fall upon the city directly.

The Los Angeles Aqueduct is not self-supporting, nor are the water department rates such as to make the works self-supporting as a whole. The failure of the city to make the necessary arrangements for the marketing of the water now available for irrigation as well as domestic uses is resulting in a very heavy burden of fixed charges for development expenses which are still rapidly accruing. The failure to coordinate the electrical development with the water supply development has also had a similar result.

When it is borne in mind that the annual interest charges upon the aqueduct amount to approximately \$1,100,000, without allowance for accrued development expense, the magnitude of the deficits becomes more apparent.

This statement is made in no spirit of criticism for an effort was made by Mulholland to properly coordinate the problem and develop

10,279 the project as rapidly as possible, but in simple recognition of the facts as they have developed and of their bearing upon the financial problems some times involved in the development of large public works of this character in our American cities.

In figuring the going concern element of value in the Spring Valley Water Company by the so-called "comparative method" (discussed in detail by Metcalf and Alvord in the proceedings of the American Society of Civil Engineers) the assumed rate of acquisition of business of the comparative plant was based upon judgment, and with some reference to the conditions which actually developed at New Orleans in the building up of the Municipal Water Works, which development has been summed up elsewhere by me.

You will see the comparison in the percentage rate assumed here for the Spring Valley Water Co., and which prevailed at New Orleans, and which I assumed at Denver. I put that in merely for comparison to show the difference in conditions as I saw them.

10,280 The first year I have assumed that the Spring Valley Water Co., under a reproduction of the plant theory, would develop 35% of the revenue of the existing plant. The New Orleans municipal waterworks actually developed 23%; that, however, included no allowance for hydrant rental, and so I made the allowance of \$40 per year for hydrant, which I believe to be large rather than small. The average at which hydrants have been rated in many of our systems in late years, where the construction cost has not been heavy, and where the pipes are laid not at a great depth below the surface, as is the case in New Orleans, has been about \$35. With that allowance the actual business—revised and including the hydrant rental allowance—becomes 44% in the first year. That, however, is based upon a return which corresponded to a reduction in rates within the period under discussion, which affects the percentage which would otherwise have applied. I have therefore figured the return upon an assumed 6% return throughout the period to make it uniform, and to make the comparison a fair one, including in my assumed actual basis of the municipal waterworks at New Orleans the allowance stated for the hydrant rental; on that basis it becomes 27% for the first year, as compared with my assumption here of 35%, and as compared with the assumption at Denver of 17%. On the second year I assumed for Spring Valley 60%; the New Orleans figures were 65%, 73%, and 44%, respectively, my 60% being, I believe, fairly comparable with the 44% for New Orleans, and the 41% assumed in Denver.

On the third year I assumed 77% for the Spring Valley, which is comparable with the 51% for New Orleans. The three years for New Orleans on the three hypotheses being 82%, 85%, and 51%, and the Denver assumption being 63½%. On the fourth year I have assumed for the Spring Valley 87% as against New Orleans' figures of

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81%, 90%, and 75%, and the Denver 81%—and so on to the end, the assumptions made as to the last year of acquisition of business making very little difference in the resulting development expense.

In the article by Mr. Alvord and myself we made an error in failing to take account of, and making deduction for the interest allowed as interest-during-construction, which tends to reduce the development expense as figured by the comparative method, which is discussed in that article. I have made that deduction here in this discussion.

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With reference to the assumed ratio of operating expenses of new plants, as compared with the established plants, I have assumed for the year before the acquisition of revenue that a certain amount of operating expenses would be incurred in preparing for the business, and in getting the business for the company, assuming 15% for the Spring Valley conditions. The actual amount at New Orleans is unrecorded, and cannot be separated from their accounts; expense was incurred on that ground I know from conversation with their superintendent, Mr. Earle, but the amount of it I believe cannot be determined at this time. The Denver assumptions were 18.9% as against 15% assumed here. In the first year of operation, that is, during which revenues are assumed to have been collected, I have assumed 15% for Spring Valley. The actual for New Orleans was 50%, and at Denver 42.7%. In the second year 75%; the actual at New Orleans having been 100%, and at Denver 59.6%. In the third year 90% assumed for Spring Valley; 100% actual at New Orleans, and 72.8% assumed at Denver, and so on through the remaining period of years.

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In figuring the going concern value by the comparative method for the Spring Valley Water Company property, the fair interest-during-construction allowance upon the reproduction cost of the property, as of December 31, 1913, was assumed to be 12%, or approximately \$4,600,000. In as much as the going concern value and interest-during-construction allowance are in a sense interdependent, if modification is made in the amount of the interest-during-construction allowance, corresponding change should be made in the going concern value. In other words, if the interest-during-construction-allowance be decreased, the going concern element of value should be increased by substantially equal amount.

Under the conservative assumption assumed and referred to above, the going concern value, or the cost of reproducing the business of the Spring Valley Water Company under present conditions, is estimated at the approximate sum of \$3,000,000 upon an assumed 6% fair rate of return upon the fair value of the property, and approximately \$4,750,000 upon an assumed 7% fair rate of return. The first mentioned amount would be approximately 7% of gross reproduction cost, and 72% upon the equitable gross annual revenue corresponding to the assumed 6% fair return conditions; the second amount would be 11%

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of gross reproduction cost, and 97% of the equitable gross annual revenue, corresponding to the assumed conditions and 7% fair rate of return.

In Table 7, attached to this statement, will be found computations of the development expense on the basis of reproducing the business of the company upon assumed 6% and 7% fair rate of return, and on an assumed value of \$43,500,000.

10,284 In Table 8 a similar computation is found upon an assumed figure of \$35,000,000. That is made merely to give an idea of the range of results which would follow from those different assumptions.

In column 1 we have the year ending on December 31, and beginning with the year 1913, the date of valuation, and ending with the year 1923, when it is assumed that identical conditions as to earnings and operating expenses will prevail, that is, as between the existing plant and the new plant, or hypothetical plant assumed to be built to replace this plant, as if no plant existed here at this time.

Questioned by Mr. Dillman.

10,285 It does not seem to me so logical a procedure to take these dates from 1903 to 1913, as it does 1913 to 1923. You are dealing with this plant with its revenue as it exists today; you are taking the position of what you might call an investor-builder who has the choice before him either of taking this plant as it exists as of the date of valuation, December 31, 1913, or of making his decision on that date to build a plant to serve this community on the assumption that no plant existed here. He then has to go to work and build up his business to the level which would be reached by the old plant. The result will not be the same if he began in 1903 and looked forward 10 years, because in making that assumption it seems to me you lose sight of the element of time required to build the new plant, which is of disadvantage to the builder, because in that period of time the old plant will actually have made progress. That is, will actually have gotten to a point of larger earnings, and larger operating expenses, and larger net revenue.

Questioned by Mr. Searls.

I assume an increased revenue as you go along year by year. I take into account the increase in population, and all those factors that Mr. Hazen gives.

Questioned by Master.

I did the same with operating expenses. If I were to take my actual operating expenses, and my actual revenues as the base, the result would be smaller, owing to the fact that the average revenue during the period would have been less than during the future period.

Questioned by Mr. Searls.

10,286 If I had had a rate which I considered adequate, the gross earnings would have been considerably less than that which I had assumed as the basis for from 1913 to 1923. That would make my

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development expense somewhat larger, assuming, of course, that my gross revenue more than keeps pace with my increase in operating expenses.

You can say that if 6% is fair, or 7%, or whatever percent you assume will arbitrarily increase your revenue, that you don't care what your rates are, but it does not seem to me that the computation is a fair one, because you are going back rather than assuming the conditions as they prevail as of the date of valuation. You are more nearly approaching the original cost conditions than you are the present day conditions, and that is the only reason for doing it, of course.

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Reverting to Table 7, in columns 2 to 4 are shown forecasts of the financial experience anticipated for the existing plant; in column 2 being shown the operating expenses, repairs and taxes, based essentially upon past experience to date of the company. In column 3 the depreciation allowance applied as a percentage of the gross revenue and in line with the assumptions as to the past allowances and an allowance of \$260,000 as of the year 1913. In column 4, the combined operating expense, repairs, taxes, and depreciation plus a fair return upon the fair value of the property.

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Questioned by Master.

The additional expenditures referred to were based on a fair cost of the additional capital which would be required to carry forward the work of the company in the future period of years, and which were taken in accordance with Mr. Hazen's assumption as to the construction cost of the Calaveras and other structures.

In column 4 we have for the year 1914 the sum of the operating expenses, \$1,321,000, that is including the repairs and taxes, plus the depreciation allowance of \$265,000, giving a total amount of \$1,586,000, plus the fair return, or the rate, called r times the value v . In this case it was assumed as \$43,500,000, although the amount is not included until the end of the computation; similarly on the second year, 1915, we have \$1,668,000 plus r times the value v , plus \$650,000 of new construction which was actually incurred in that year. I think the exact amount was something like \$653,000, and the computations are carried forward in this column in that general way. In columns 5 to 9 are shown similar figures estimated for the comparative plant, in column 5 being shown the assumed percentage of gross revenue for the comparative plant, as compared with the actual revenue anticipated for the existing plant, the percentage as stated therein being just previously referred to in the text of this exhibit. By the existing plant, I mean this plant as it is here, and as it is assumed to operate in the future period of years. Take the year 1917, which is the first year of assumed operation, I assume that this comparative plant would acquire 35% of the revenue of the existing plant; the revenue of the existing plant estimated for that period is

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shown in column 4, being made up of the operating expenses, repairs and taxes, depreciation allowance, and a fair rate of return upon the then fair value of that plant as found by the court; similarly the operating expenses, repairs and taxes estimated for the comparative plant are shown in column 7 for the year 1917, being 50% of those estimated for the existing plant, or \$730,000.

Questioned by Master.

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Referring to column 6; the \$2,310,000 is 35% of \$6,600,000 times r which occurs in column 4, plus \$606,000 which is 35% of \$1,732,000, which occurs in column 4. This is merely a rearrangement of these terms; the depreciation allowance assumed for the comparative plant does not begin until the year 1907, and is estimated then on a similar basis to the existing plant at \$100,000, being increased according to the amount of construction involved, until it reaches a similar amount to that assumed for the existing plant in the year 1922, \$354,000. The net revenue then for the comparative plant is shown in column 9 for the year 1916, being a negative quantity growing out of the fact that operating expenses are assumed upon the new plant in anticipation of the building up of the business; that is, during the last 6 months of the year prior to the actual furnishing of water, expenses would be incurred looking toward the successful operation of the plant during the following year; therefore there is a deficit of \$213,000 in revenue in the year 1916; in the year 1917 the net revenue is found by deducting from the gross revenue of the comparative plant shown in column 6, the sum of the operating expenses, repairs and taxes shown in column 7, and the depreciation allowance shown in column 8 for each of the years 1917 to 1922. That last result appears in column 9 on the line for the year 1917; for instance, it is .35 vr plus \$2,310,000 times r minus \$224,000. The \$224,000 is the difference between the item \$606,000 occurring in column 6, and the sum of the items \$730,000 occurring in column 7, and \$100,000 occurring in column 8; in other words, it is the difference between \$830,000 and \$606,000.

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Questioned by Mr. Greene.

There is no column in which the result of 35% vr plus \$210,000 minus \$224,000 appears. In other words, I did not want to make the computation until I had assembled all of these items at the end, when it results in a very simple mathematical formula in which the Master could apply his assumption as to value.

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In column 10 appears the excess net revenue of the existing over the comparative plant, without correction for interest credits. In the year 1914 we have the net revenue of the rate times the value—we are dealing now with net revenue, not gross revenue—the net revenue of the existing plant being the item vr shown in column 4, the first item of \$1,586,000 in column 4 covering the operating expenses, taxes and depreciation; similarly on the line 1915, we have

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the net excess revenue of the existing over the comparative plant, as shown by the last parenthesis in column 4, the rate r times the value v plus \$650,000, the comparative plant having no net revenue during that year.

On the third year, 1916, we have the figures shown in the last item of column 4 for the existing plant r times v plus \$2,900,000, minus the deficiency of the comparative plant of \$213,000, or plus that sum, minus a negative sum, and similarly the other items shown below for the several years 1917 to 1922 inclusive. We now have to make a correction for the interest accounts which for a large property of this sort become very important. In a small property they are negligible. It then grows out of the assumption that as of the date of valuation, December 31, 1913, it is assumed that the investor-builder has the purchase price for the existing plant, or for the building of the new plant; therefore, if you are making a comparison of the relative experience which he will have, if on the one hand he buys the existing plant and pays over his entire amount immediately, or on the other hand begins to build the comparative plant, you must take into consideration the amounts of money which he will still have in bank until he actually invests them in construction. Now those sums are presumably earning interest for him until they are invested, and by the amount of those earnings the interest or development expense must be decreased. Similarly, if you allow to the investor-builder, or rather, to the builder the interest during construction, or a portion of his interest charges upon the capital which he invests in construction during the construction period in the so-called interest-during-construction item, which I have assumed here, amounts to \$4,600,000, allowance for that fact must also be made, because it also tends to decrease the cost of developing the business, or, in other words, the development expense. Proceeding on that theory, then, I have made the computations shown in columns 11 to 18, all of which relate to the comparative plant determination of interest upon unemployed capital and upon the capital invested in construction, and allowed for as interest during construction during the building period. In column 11 we have the total investment to date, including interest-during-construction; you will note that I have shown a double line of figures in this column, the one covering the total reproduction cost of the existing plant, the other the additional construction which it is estimated will be incurred during the coming period of years from 1913 to 1922. In order to simplify the computations, however, the amount of the betterments is not here accounted in dealing with the interest problem, because it is assumed that these betterments would have to be built for the existing plant in exactly the same way that they would be by the comparative plant, and, therefore, there is no difference in the results; the computation, therefore, is simplified by

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eliminating them from consideration in figuring this interest account. 10,294 In column 12 is shown the amount of unemployed capital which is assumed can be invested safely and be kept in liquid form and earn a 4% rate of interest; it must be kept in absolutely liquid form, so that any money needed can be withdrawn as needed; the first amount being as of the year 1913, December 31, \$43,500, in accordance with the original hypothesis upon which this table or computation is predicated.

In column 13 is shown the amount which has to be withdrawn for construction during the year under question and to meet the going-concern costs; that amount for the year 1914, you will observe, is \$5,000,000, covering largely payment for lands; and, deducting that from the amount in hand, \$43,500,000, it leaves in column 12 the amount of unemployed capital still invested at 4% interest, in the year 1914, \$38,500,000; similarly, in the year 1915, it is assumed that \$10,098,000 will be withdrawn, the greater part of that being also for real estate purchased, which reduces the amount of unemployed capital still in the hands of the investor-builder, which is still invested at a rate of 4%, and earning a rate of 4% to \$28,402,000; similarly, the remaining figures are obtained.

In column 14 is shown the interest at 4% upon the amount shown in column 12 as being unemployed, and still in the hands of the investor-builder.

In column 15 is shown the interest which it is assumed that he will earn upon his bank balances during the current years referred to. For instance, in column 13 there is shown in the year 1914 an amount of \$5,000,000, which, it is estimated must be withdrawn for his construction; it is assumed then, as appears in column 15, that upon this sum of \$5,000,000 the investor-builder will earn a 2% rate of interest for one-half the period of time, or for 6 months, or, in 10,295 other words, 1% of that total sum, which is \$50,000. Similar computations are made for each of the years 1915 to 1919, inclusive, that is, to the end of the construction period. In column 16 is shown the sum of the interest amounts shown in columns 14 and 15, covering the interest upon the unemployed capital, and upon the bank balances of the current year, amounting, for the year 1914, to \$1,590,000, for the year 1915 \$1,237,000, and so on.

In column 17 is shown the interest-during-construction item assumed by me heretofore, amounting in the aggregate to \$4,600,000, and applied in the several years 1915 to 1919 to accord with the construction expenditures upon those years. In column 18 are shown the sums of the total interest allowances comprising the interest upon the unemployed capital, the interest upon the bank balances of the year, and the interest allowed as interest-during-construction, amounting for the year 1914 to \$1,590,000, for the year 1915, \$2,137,-

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000, and so on for the remaining period to 1919, inclusive. In column 19 appears the final computation of the annual excess in net revenue of the existing plant over the comparative plant, which was found by correcting the excess net revenue of the existing over the comparative plant shown in column 10, by the amount of the combined interest allowance shown in column 18; that is, for the year 1914 in column 10 the net revenue of the existing over the comparative plant was found to be vr without correction for interest credits; from this amount then is deducted the interest credit of \$1,500,000, giving the result shown in column 19, vr minus \$1,590,000.

The reason for deducting interest-during-construction on the structures is because it is included in the reproduction cost estimates, and if I did not deduct it here, I should be duplicating that element. Similar computations are made for each of the years 1915 to 1922, inclusive. Those are the results in the financial operations, as anticipated for the years under question, and in order to give weight to the time element we have to apply the present worth factor to bring those sums of money back to the date of valuation, December 31, 1913, and therefore, the result shown in column 19 for the year 1914, covering the annual excess in net revenue of existing plant over comparative plant is reduced by the amount of the present worth factor .9434 at a 6% rate, as shown in column 21, and gives the amount as shown in column 22, being .9434 vr minus \$1,500,000. Similar figures are given for each of the other years, and they are finally summed up in the total, as stated at the foot of the column, amounting to 3.6686 vr plus \$9,819,000 times r minus \$7,072,000; in other words, as stated in words, according to these hypotheses, we find that the going-concern element of value under reproduction cost conditions corresponding to the assumed hypothesis is three and two-thirds times the equitable net annual revenue for the year 1915, which may be found by the court, plus the product of the assumed fair rate of return, times the sum of \$9,819,000, less the sum of \$7,072,000. I have shown here the results found by assuming a valuation of \$43,500,000 as of the year ending December 31, 1913, on fair rates of return, of 6% and 7%, respectively, these amount to the sum of \$3,030,000, and \$4,780,000; the first of these sums is 73% of the assumed fair annual gross revenue, and 7.6% of the assumed value; the second is 104% of the assumed gross annual revenue, and 11% of the assumed value. The equitable gross annual revenue corresponding to these assumptions is upon a 6% fair rate of return \$4,154,000, upon a 7% fair rate of return \$4,589,000, all substantially more than the actual rate of return as of that date. Similar computations are shown in Table 8, based upon an assumed fair value of the property, approximating \$35,000,000, resulting in estimated going values of \$2,837,000, corresponding to a 6% fair rate of return, and \$4,219,000, corresponding to a 7% fair rate of return.

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10,298 DEVELOPMENT EXPENSE VS. PIECEMEAL CONSTRUCTION.

It has sometimes been urged that while the cost of originally building up the business of the company was real and tangible, the development expenses incident to the enlargement of the plant were absorbed in the operating account, and therefore that the going concern value of any property would not increase in substantial amount thereafter. This is believed to be contrary to actual experience, however. While it may be true that minor extensions may not involve development expense, they do involve greater cost by reason of their so-called piecemeal construction. Thus the cost of extending mains 100 feet or less, or even for 1000 feet, is likely to be substantially greater per foot than it would be if an extension of several miles in length were made at one time,—by reason of the cost of getting the plant and men on to the ground and the work running in an efficient manner. The additional cost of this piecemeal construction is not provided for under the usual assumptions as to the cost of reproducing the structural plant, it being assumed that the physical plant shall be built as a whole in as efficient and advantageous a manner as possible.

10,299 In general, taking the short extensions into account, I believe that the additional cost of construction is greater than the development expense would be as figured upon doing the work in major amounts, and adding at reproduction cost figures, assuming as short and as efficient construction as possible, the allowance for development expense; or, in other words, the development expense might amount to from 10% to 15% of the gross reproduction cost, and the cost of piecemeal construction is likely to be considerably more than that, unless the extensions are made in substantial amounts. In figuring our reproduction cost here, we have not assumed piecemeal construction; we have assumed the construction work in such manner as to produce the most efficient and cheapest construction, all things considered.

10,300 I might say, with reference to the construction of the additional water supply plant, built by the Metropolitan Waterworks 15 years or more ago, in Boston, the actual development expenses which resulted at that time amounted, according to Mr. Stearns' statement (the chief engineer of the company) at the actual rates of interest paid by the Metropolitan Board on the bonds, which was about 4%, it amounted to 7%, and the money which was paid in the form of coupons upon those bonds was provided for actually by increasing the bond issue in order that they might not have to increase the rates to carry the additional construction during the first few years, it being regarded as better business policy not to raise the rate, but to absorb the development expense in that way, and amortize it through the sinking fund on the bonds. It is my judgment that in any piece of

additional construction you would either have the loss in earnings, which I have termed the development expense, or the additional expense from piecemeal construction. If the additional construction were comparatively small, so that the burden of the interest charged would constitute but a small portion of the net revenue, you might be able to carry it without seriously disturbing the net rate of return, but it would tend to create a deficit, the amount depending upon the magnitude of the construction involved.

Even if history showed that the company had waited until the demand for water was so much in excess of the actual supply that practically all of the additional supply could be taken up as soon as it was constructed, I think the condition such as I have just stated would apply, though the condition would not be so aggravated as under other circumstances. I say I think it would apply, for the reason that conduit systems, for instance, are designed for a period of years in advance of from 30 to 50 years, while the distribution system only for from 15 to 20 years. It is not conceivable that you could run on many years in order to defer the construction at the expense of serving the public, so it would not be possible, practically, to postpone the construction of the conduit system to a date when you would have increased business enough immediately to carry the charges. As to the minor distribution extensions, that might perhaps be done with individual streets, for instance. It would tend to reduce the effect if that policy were adopted, surely.

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Moreover, it is to be borne in mind that while the distribution pipe system may be extended from time to time without involving much development expense, there come periods of reconstruction when there becomes necessary the reinforcement of the distribution pipe system, the building of additional pumping plants, or the introduction of new or additional sources of supply, which involve such heavy expenditures that the resulting fixed charges cannot be met by the existing rates for a period of years. Under such circumstances it has usually been believed advantageous to provide for the meeting of the added interest charges which may be involved by the new investment otherwise than by the revenue earned from the sale of water, as for instance, either by increase of the capital sum, the payment of the interest charges through direct taxation, the omission for a time of contribution to the depreciation account or to the sinking or amortization funds, and such has been the experience of many cities having municipal water works, as well as of those cities which are supplied by privately owned works.

Examples of this kind are to be found in the case of the Metropolitan Water Works of Boston which borrowed money in excess of its construction needs to meet the interest payments upon the bonds issued to build the additional water supply. New Orleans met the situation by direct taxation. Los Angeles, Cal., St. Paul, Minn.,

and Portland, Oregon, have met the situation by charging to the abutting property owners substantially the entire cost of the distributing pipe system. Many other examples might be cited.

Questioned by Master.

10,302 Referring to the subject of interest-during-construction, where I assumed 2 years of interest-during-construction, amounting to 12% as representing the average conditions: You may assume one of two things; either that you so co-ordinate or arrange all of your construction that the plant will be ready to begin operation as of December 31, 1913, or you may assume that the construction will be so organized as to give you a more uniform rate of construction throughout the construction period, being governed in the length of that period by the more important structures which have to be built, and that under those circumstances you will acquire business at a much earlier date than you would under the first assumption. Under the first assumption you might assume that all of the business was there ready to be connected up immediately; in the second assumption that the business was there ready to be connected up as district after district, operating unit after operating unit was put into service. I have assumed the second method, to-wit, that the plant is to be reproduced along such lines as to give a better disposition of the forces to enable you to carry along a certain organization, to build the plant as a whole, going through stage after stage of development, believing that you get in that way more nearly what experience has shown we strive for in construction, and that you get, as a result of that method of operation, a cheaper cost of building the plant—structural cost, in other words, for the reason that if you adopt the other expedient of planning your work to have it all ready finally as a completed whole for beginning operation on December 31, 1913, you will have comparatively light construction the first two or three years, and a very heavy expenditure the last two years.

10,304 Your organization cannot possibly, in my judgment, be as efficient; your administrative cost would have to be proportionately greater in order to take care of that sort of construction than they would be if you had a fairly uniform organization operating through a longer period of years. The difference, as I see it, is that under my assumption the development expense would be more, but the unit cost of reproduction, and particularly of interest-during-construction charge, would be substantially less than it would under the first assumption. Moreover, under the first assumption there would be a hazard element which might be very serious, in that if your plant could not be operated as of the planned date of completion, you would involve carrying charges on substantially the whole enterprise during the period of time which might elapse from the projected date of completion to the actual date of completion of the plant, whereas, under my assumptions if any single unit fails to operate

as planned, other units are, nevertheless, operating, and are earning their revenue, so that the financial burden is less to the plant.

Furthermore, it does not seem to me it is quite fair to assume that the business is all there ready to turn on immediately that the works are built. In the first place, that has not been the experience in the places where waterworks have been built in the past. Take, for instance, the situation at New Orleans: A Yellow Fever epidemic, a desire to get rid of cisterns, etc., caused a drastic ordinance to be enacted, under the terms of which connection with the new plant could be compelled; in spite of that they were not able to connect up at any time more than about 14,000 services in the year. The Board, as a matter of policy, I fancy, did not care to apply the thumb screw to the people and force them to connect. It is a fact that in spite of those conditions they did not acquire their business for a six-year period. A similar experience has been had in other places, particularly in the smaller works built in late years, and in the larger works built years ago, so that it is not in accord with experience. Moreover, that was not the situation which this company actually met in fact. The company had to build up its business. There are sources of water supply about the city, which, it may fairly be assumed, would have been in use had there been no waterworks supplying the city. There has been no time at which, in the life history of this plant, all of the public was supplied by the water company.

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Questioned by Master.

It does not seem to me that it is fair to assume that the business could be acquired in San Francisco over night. I have allowed a certain time to get business, and it seems to me that to make any other assumption is really to beg the question. If you assume that the business is there and ready, and will be connected up the next day, are you not assuming in effect then that the business is established? We start with the hypothesis that there is not an established business. We will measure the cost of establishing the business by assuming that there is no business in that community, and that you are going through the steps which will be necessary to develop the business. A public utility corporation, no matter what its character, goes through the experience of building up business; it does not make any difference whether it is a waterworks, or a gas plant, or an electric light plant, it goes through that experience. I mean that that element must be allowed, even in reproduction, meaning by reproduction the cost of reproducing in that community a business on the assumption that the business did not exist prior thereto. It does not seem to me that you are entitled to the assumption that the business does exist. You assume that the people are there. Take the conditions as they exist in communities where there is water to be had in larger measure than in this community, you

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will find that your territory is not thoroughly saturated, there are many who do not take the water; by dint of good business energy the utility may very substantially increase its business and its revenue, even under those circumstances. Of course, the more nearly you approach the condition of an arid desert with no water supply, the more nearly you approach the condition of an existing business. It seems to me, though, that that is not a fair assumption. I have assumed, so far as the distribution system is concerned, that that will be built at a rate of approximately 100 miles a year, and that the year after the completion no further interest charge is borne by that pipe line, which is included in the interest-during-construction item, but that the business will be acquired on that pipe line. However, I have assumed that the entire existing business of today will not, on the second year, be acquired by that pipe line, but that it will require a somewhat longer period to acquire that business.

Questioned by Mr. Searls.

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I have not assumed that all these things which contributes to the population, and to the elements of value in the company's physical plant, are not here. Do you realize that when I assume that in the first year the comparative plant will get 35% of the gross revenue in that year I am in effect assuming approximately that by the end of the first year of operation it will have 70% of the rate of revenue of the existing plant? At the beginning it had none; at the end of the year it has 70%; it has earned then during the year 35% of it. To say that you have gotten 70%, or rather at the rate of 70% at the end of the year, seems to me a very big slice of the business. It is much more than you could hope to get in any community where there were any other facilities for gathering water. That was not based on my New Orleans experience, which was only one of the considerations. I worked it out quite independently from the point of view of pipe mileage and earnings per mile of pipe, and per capita.

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I assumed that there were other works here supplying water, and this period would be necessary in making the physical connections, and in inducing the business. I did assume that a period of 6 years would be required to acquire all of the gross revenue. As a matter of fact, the bulk of it is acquired in a period of 3 years. In other words, at the end of the first year I assumed that in the first year of operation it would have acquired 35% of the revenue. That means that at the end of that year it would have acquired services enough to give it a revenue corresponding to 70% of the revenue of the existing plant. I have assumed that it would take a period something over 3 years to connect all of the taps.

I did not assume the existence of a competing plant. I assumed that there was no waterworks system as a whole in the community.

Questioned by Master.

If there were a competing plant here it would not, in my judgment, be possible for the comparative plant to acquire business nearly so rapidly. Your development expense would be much greater. I have not assumed that, however. I have assumed no competition. I have assumed that people would naturally come to this supply, and desire it, and take it. I have assumed that the pressure was the result of natural conditions; that you were in a dry belt here, and had not the facilities, so that the business would be acquired at a rate commensurate with the existence of that sort of pressure. 10,311

I have not included in my element of value any notion of cost of acquisition—solicitation, advertising, and that sort of thing. Such costs as those are covered by the operating expenses.

We now come to a consideration, on page 16, of precedents in court decisions and commission rulings, showing the excess of award over depreciated reproduction cost in amount and percent, covering development expense, or going-value, intangible values, etc., so far as recognized in the award. Take the Newbury Water Co. case, the 17% is the result of deducting \$40,000 from \$275,000, leaving \$235,000, and dividing \$40,000 by \$235,000, you will get 17%. The \$40,000 is named in the award. That is likewise so in the other cases. 10,312

Questioned by Master.

It is the difference between the total amount of the award, and the stated depreciated reproduction cost. There are no means of segregating the development expense, or going-concern value, from the franchise value, or any other similar intangible value that may have been allowed. Therefore, all that I can give you is the difference between the physical property, including lands and structures, and the final award. There are a few cases in the table in which the court definitely refers to some allowance for going-value. That is the case in the Denver Union Water case, where the Master made a specific finding; he referred to what had been proven, or what might be justified in the way of development expense, or going-value, and then summed the matter up by saying that in the light of historical conditions he found this amount; that is, the excess over what he allowed for the land and the water rights, and the depreciated value of the structures. The total valuation of the plant did not cut any figure in the average as I figured it. It is an average of the individual percentages found. 10,313

Questioned by Mr. Searls.

Almost all of those cases were condemnation cases. 10,314

Mr. Olney: Reading from the Omaha case, here is what is said with regard to the Kansas City case: "That there is a difference between even the cost of duplication, less depreciation, of the elements making up the water company plant, and the commercial value of the business as a going concern is evident. Such an allow- 10,315

"ance was upheld in *National Waterworks Co. vs. Kansas City*, 27 "L.R.A. 827, 10 Ct.C.A. 653, 27 U.S.Ap. 165, 62 Fed. 863, where the "opinion was by Mr. Justice Brewer. We can add nothing to the "reasoning of the learned justice, and shall not try to".

10,316 Mr. Metcalf: The Denver case was a rate case. It is my impression that the Milwaukee Electric Railway & Light Co. case, 10 Wisconsin Railroad Commission, page 1, was a rating case. I think also the Milwaukee Gas Light Co. case, 12 Wisconsin Railroad Commission, 441, was a rate case. I think the Madison Gas & Electric case was a rate case, too, but I am not certain.

Questioned by Mr. Dillman.

The application for this going-concern value was denied in this court, and I think there are several other precedents for that.

10,317 On the following page I give a memorandum in regard to the assessed valuation for taxation, which I do not regard as of any great significance, but it is in accordance with the facts, I believe. In City Engineer C. E. Grunsky's reports, for the years 1901, 1902 and 1903, the following allowances for franchise and going-concern values were made upon the property of the Spring Valley Water Co., and these amount respectively to \$1,400,000, \$3,650,000, and \$3,900,000; the year 1901, containing no allowance for franchise value, but merely for going-concern value.

DIRECT EXAMINATION BY MR. GREENE.

10,321 To sum the matter up, as the result of these studies, and such study as I have been able to give to this problem, I am of the opinion that a fair allowance for development expense, or the going-concern element of value in the property of the Spring Valley Water Co. would be the sum of \$3,400,000 as of the date December 31, 1913, and this is the allowance which I have adopted. On the other years involved in this proceeding I have taken approximately the gross annual revenue, one year's gross annual revenue as of the dates involved, and that is just about what this \$3,400,000 amounts to; it was in substantial accord with the gross annual revenue at that time. Mr. Hazen took one year's gross annual revenue.

10,322 On page C, I submit also under item 7 the following development expense as determined first by the difference between the bond and stockholders' actual cash investment in the property of the Spring Valley Water Co., from 1858 to December 31, 1913, without allowance for deficiency in return, and second, by said investment, increased by the deficiencies in fair return (or decreased by the excesses in fair return), carried into the investment account annually, thus giving the so-called capital sum, and as measured by the difference between the actual percent rate of return upon the capital sum, and the rate corresponding to the estimated fair cost of money, without profit, to this company. See "Plaintiff's Exhibits 12-BB and 12-CC". Bond

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and stockholders' investment, including correction for cumulative deficiencies, and excesses in return, being \$40,382,000; on the other hand, the bondholders' and stockholders' actual cash investment, excluding allowance of lost interest in the year in which investment was made, \$27,526,000, the difference being \$12,856,000. In the latter computation no allowance was made for appreciation in property value, the computation being based on the price at which the bonds and the stock of the company were sold.

When you take a long period and compound the interest over a period of time, it makes a substantial difference whether you took the actual conditions, or assumed average conditions, and it is one of the reasons for feeling that that method of computation after all is pretty speculative. The more accurate way would be to apply actual rates of appreciation, but I did not know what they were, and none of the real estate men could give me those figures, and I did not care to guess about that. I do not personally think that that method of computation, as applied to so long a period of years, is of very much comfort or aid to judgment, because of the tremendous effect on the result of the assumptions which you make, by reason of the compounding and the assumptions in regard to what should be assumed to be the fair rate of return. 10,323

(The net or depreciated reproduction cost estimate of the property of the Spring Valley Water Co. introduced and marked "Plaintiff's Exhibit 199".) 10,324

On page 1 of Exhibit 199, I give a summarized statement of the net or depreciated reproduction cost of the property of the Spring Valley Water Co. in use in the waterworks business in the service of the public as of December 31, 1913, comprising lands in the first instance, with a 3% overhead allowance, and 12% interest-during-construction allowance, amounting to \$21,045,000; in the second instance, excluding the overhead and interest-during-construction allowance, and amounting to \$18,243,000. Second, water rights, excluding overhead and interest-during-construction \$4,000,000. Third, structures, including 15% overhead, and 12% interest-during-construction allowance, and deduction for accrued depreciation, \$19,976,000; Fourth, the going value, \$3,400,000, making a total of \$48,421,000, including overhead and interest-during-construction allowance upon lands, or \$45,619,000, excluding this overhead and interest-during-construction upon lands. 10,325

Questioned by Master.

My depreciated value of structures, with overhead addition, was something like \$21,000,000, while here it appears as \$19,900,000. That grows out of the deduction for pavements over distributing mains, which were also subsequent to the laying of the pipe, and one or two other corrections.

DIRECT EXAMINATION BY MR. GREENE.

10,326 On page 2 of this exhibit I take up first the lands in use; first the city properties upon the figures agreed to by Mr. Baldwin and Mr. Paschel, representing the company and the city respectively, amounting to 90.62 acres, \$1,015,000; second, the Merced properties of 2,574.79 acres, amounting to \$6,545,000, being the average of Baldwin and McDuffie's estimates upon lands, and including for the value of the reservoirs the average of Baldwin's \$669,275 estimate, McDuffie's \$442,042, and Grunsky's \$336,000, the average being \$482,000. The Pacific Slope lands, that is the portion of the drainage area of the Merced lands, which is tributary to the Pacific, and not the Merced Lakes, amounting to 251.64 acres, valued at \$532,196, are excluded, together with Parcel No. 25 on the outlet stream, which was valued by Baldwin at \$401,625, McDuffie \$357,000, or an average of \$379,312, which would be required, according to my view, to control the water rights. Parcel No. 25 covers $89\frac{1}{4}$ acres, and I left it out of the land values, but included an allowance for the water. I might have done the other thing; the difference is not material, because the yield of the Merced Lakes is approximately $3\frac{1}{2}$ million gallons day, which, at \$100,000 per million gallons capacity would be \$350,000 as against this average figure of \$379,312.

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I have included in the reproduction cost estimate the Merced properties from the following considerations or point of view: First, that these lands have been in fact in the use of the public as a source of water supply, and as furnishing reservoir capacity which has been of great value in the emergency of the fire which followed the earthquake of 1906. Also from the point of view that had these lakes been thrown out of service as a source of supply, it would have been necessary to have gone to the Calaveras, or some other distant source, to have replaced them, and in going to the added source it would not have been possible to have built the pipe line of just sufficient capacity to provide the additional quantity needed within a limit of a few years, but it would have been economically desirable to have built a conduit looking forward to a long period of years which would have involved a cost, as estimated by Mr. Hazen. I have given weight, too, to the discussion submitted by Mr. Hazen upon this subject, and to the actual conditions which have confronted the management of the company in its past period of years from 1907 to 1915; also to the fact that these lands were included at a valuation of \$3,383,000 by Judge Farrington in his opinion as of the year 1903.

10,327-39 (Here ensued a discussion among Counsel as to the propriety of admitting as proper evidence a report of the proceedings had between the officers of the company and the Board of Supervisors in the matter of fixing water rates in 1913, with particular reference to the use of the Merced land. Counsel for Defendants objected to Mr. Metcalf's

statement of the contents of the report, and also objected to the admission of the report, on the ground that it is hearsay, and not evidence at all. The Master reserved his ruling until tomorrow, April 20, 1916.)

ONE HUNDRED AND FORTY-FIRST HEARING.

APRIL 20, 1916.

Witness: LEONARD METCALF for Plaintiff.

(The motion of Counsel for Plaintiff to strike out the value of the adjoining land column per acre, particularly with reference to San Fernando and Franklin lands in connection with Mr. John T. Martin's testimony, was denied.) 10,342

(With reference to the Merced lands: The objection to Mr. Metcalf's statement of what may have been said by any member of the Board of Supervisors, or by a committee of the Board of Supervisors, or any action taken denying a petition on the part of the company to exclude the lands from the public use, and to sell them for private uses, would be unnecessary and ineffective, and the objection will be sustained.) 10,343
10,345

Witness: LEONARD METCALF for Plaintiff.

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DIRECT EXAMINATION BY MR. GREENE.

With reference to the Merced Ranch, I exclude the parcel at the outlet of the lake, but include the water rights, and I excluded the portion draining into the Pacific Ocean; otherwise I have included all of the Merced Ranch. I hold that it was reasonable and desirable from the company's and the public's point of view for the company to purchase these lands, and protect the purity of the watershed. They have been so used. In spite of the ownership of these lands, the quality of the water in the Merced basins has deteriorated. Increase in population which has come in that region would inevitably bring about that condition. The lands have actually been so used, and it seems to me that in view of those facts, and the fact which I have cited, that the substituted supply would have involved even greater cost, it is reasonable to include them in the reproduction cost estimate. Metcalf
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As to whether the full value of the lands should be included in the rating base or not, it seems to me is open to discussion, and as a matter of fact, it is the most important consideration which has led me to make a reduction from the reproduction cost of the property in formulating my rating base; in other words, I believe these lands have already come to the point where they are so valuable that it is no longer desirable to hold them for strictly water production purposes,

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but as a result of the situation which has existed, and the very large expenditure which would be involved in getting a substituted supply, they have been used up to this time, and will have to be used for a further period of several years. I have, therefore, included them in the reproduction cost estimate, but I have made a substantial reduction from the reproduction cost figures as applied more particularly to the lands, and perhaps water rights, and going value. I hold the opinion that it will always be desirable to retain a certain portion of the lands about the Merced Lake, with a view to the utilization of the lake in times of necessity as an emergency supply. I am of the opinion that the value to the community is far in excess even of these figures, if it were to be rated on the basis of the protection which it affords, or even on the basis of what might be the increase in insurance rates which might result from the taking away of the Merced Lakes as a possible source of fire supply. Of course, there are no means of determining just what that would be. In any event that would perhaps be a superior limit of the value to the community from the fire protection, or hazard point of view.

There is a very substantial difference, in my opinion, between the necessity for holding the drainage lands in these two cases, first, assuming that that is used purely as a reserve supply in case of a catastrophe like that of 1906, and second, in case a constant use has been made of it during the years 1907 to 1914.

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Even in New York recently, there has been very bitter agitation on the subject of certain public institutions being built upon the watershed at a considerable distance from the source of supply, even admitting that the plans call for proper protection in the shape of satisfactory sewage disposal works. It is possible, for emergency use, to adopt expedients such as the use of hypochlorite, which would make the supply safe. It would be possible for the people to boil their water during the period of use in emergency, but to require the people to boil their water constantly when there was no emergency is unreasonable, and would not be tolerated by the public. Similarly, the use of hypochlorite upon water containing a large amount of organic water is likely to leave tastes which are objectionable to the public.

Moreover, the willingness of certain men to accept the use of hypochlorite as a solution of the danger of pollution, is not safe, or in line with sound practice. The margin of safety is too small, because there is always danger of interruption in the application of hypochlorite, or that the hypochlorite itself may not be up to a full efficiency. It is wiser to filtrate the water first, though you may wish to add the hypochlorite after filtration. In certain works, for instance, in Indianapolis, where they have an excellent filter plant to overcome the bacterial activity of the filter bed in winter, they make use of hypochlorite in addition to the filtration, merely as a precautionary measure.

Questioned by Master.

We regard the action of the filter bed essentially as a bacterial one. The sand grains become surrounded by what is called bacterial jelly, a growth of organisms, and when the water passes slowly through the filter bed, and comes into contact with this bacterial jelly, and a purification is accomplished by those organisms, the greatest activity being in the superficial layers of the bed, that is, near the surface of the bed. Take, for example, the situation at Pittsburg, where the water used in the supply is taken from the Allegheny River, the mines deposit their culm banks on the banks of the river, and they go through a heating process during the summer due to the sulphur in the coal, and when the heavy rains of fall come they wash this down, and you get an acid condition of the river. That acidity has been great enough on several occasions to actually substantially sterilize the bed, so that until the bacterial activity was again established, the efficiency of the bed fell off tremendously; in other words, during the period of time the bed acted solely as a strainer. The bed then acts in a dual way, first as a mechanical strainer, and second as an actual living organism. Those bacteria are not pathogenic bacteria in the sand. The numbers of pathogenic bacteria are very much smaller than the numbers of other bacteria which are harmless to man. If that water were filled with typhoid bacteria coming into the filter bed, those typhoid bacilli would be caught and killed, as it were, by this other bacteria that are there resident. The hyperchlorite, if by any chance they should get through the filter bed, would kill them.

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Questioned by Mr. Olney.

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The beds remove both bacteria, the pathogenic, and the other. With slow sand filtration you will get a reduction of from 97% to 99% of the bacteria, the great majority of which are not pathogenic. The form of the nitrogen content is changed from the albuminoid-ammonia form, or the ammonia form into the nitrate form, and is harmless to man, but which is the best kind of plant food.

In the filtration of sewage at Marlborough, the city disposal plant, when the efficiency of the beds was improved by certain changes that were made, we got a very pure effluent, but one which contained a very large amount of dissolved oxygen—of the nitrate, as the chemists call it, which is harmless to man, but which resulted in a most luxuriant growth of duck weed, and other aquatic forms of plant life in the stream below, and in the lake below, which got the city into trouble with some dairies as the result of the subsequent putrifaction of this duck weed, so that the more highly we were purifying our effluent, the more trouble we were getting into further down the stream.

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So far as the purification of the water is concerned, it would be perfectly possible to take the water coming to the lake and filter it, and by the treatment with hypochlorite to get an effluent which would

be perfectly safe, from the public point of view, but it does not seem to me that the conditions now prevailing on the Merced property would justify the introduction of a filter plant of a better type than the one which is now in use, because of the increase in values, and furthermore, because of the fact that the water in itself does contain so high an organic content, which is not desirable from a health point of view, that is to say, the other water is to be preferred.

10,353 I think the feeling of the medical fraternity and sanitary engineers today is that it is desirable to have water which is not high in organic content. It is desirable for a further reason, and is of substantial importance here. If water of that creek were pumped into the reservoirs on the hill-tops here, it would tend to increase the growth of algae, and might tend to necessitate the covering of the reservoirs, which would involve somewhat increased cost, but even with the introduction of such plants, it has been generally considered desirable to maintain the purity of your water so far as practicable before actually filtering it, by the purchase of the watersheds which are tributary to the water supply. As I have stated, the time may come, and in this case I think it has come, where it is no longer reasonable to go to the expense, that is, for an indefinite period of time, of maintaining this supply; it is wiser to seek other sources on that account. The effect of the encroachment of population has already been felt, and it will be felt more certainly as time goes on.

10,354 I should feel that if the lands were built up in proximity to the Merced supply along the lines of the area indicated in the condemnation proceedings, that the public would not be so safe in the use of the Merced supply as it is today; that it would be desirable to put in a different form of filter plant if that were to be done. It does not seem to me that that is the economic solution for that situation. The desirable solution is to maintain the lake as a reserve supply for emergency use, and not for daily use, but to get water from other sources; if that is done, it is not worth the expenditure involved to build a new filter plant which will give the higher efficiency, which, in turn, would bring about the greater safety in the use of the water.

10,355 The increase in the density of population, more particularly up in the direction of Daly City, and on the slopes adjacent to the Merced Lakes, has, in my judgment increased the organic content of the water. Had I been operating the plant, I would have been fearful that the building up of that district would mean that you would have more children on the lake shores, playing around there, it would have been more difficult to police, and somewhat more expensive, and the presence of workmen incident to the laying out of the roads, and the building of buildings, would have added a hazard. That often is a very serious hazard, too, because you cannot always control their actions.

The manure on the ranch, and all that cultivation of the vegetable gardens, would tend to increase the organic content. The chance of a pathogenic bacteria, perhaps, is not proportionately so great as the human excreta, but it undoubtedly does increase the organic content.

Mr. Sharon: Mr. Behan just tells me that the practice of allowing the gardeners out there to use that land was started about 1910 or 1911. I would have said myself that it was a little earlier than that.

Questioned by Master.

This is not my rating base; this is my reproduction cost estimate. I have taken \$6,500,000 in my reproduction cost estimate; in my rating base I would take a lower figure, which can be made up from reductions from Merced and from going concern, and other matters, but the point of major consideration in that was the Merced property; that was the most important consideration as I view it. My judgment is not very far from that of Mr. Hazen, who went through a similar process as to Merced alone.

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Questioned by Master.

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Since I came out here I have given a great deal of study to this general situation, and as a result of that, I feel that the figures finally arrived at by Mr. Grunsky are fair in the light of all the facts which have been adduced. I have not any independent evidence as to the value of reservoir properties, except as I have had experience in the purchase, or known about some purchases of lands for reservoir purposes which give indication of the excess cost of such properties when finally assembled, over what was estimated was the cost of the properties before they were acquired, as measured by sales in that region. I have been in the habit of making computations of that sort on the basis of certain multiples which I have found to exist in different places, and the use of which is prescribed in the Minnesota rate case. I have no objection to stating my opinion of that situation, and what I have found in different cases actually developed in the way of multiples in excess of the cost of such lands, but I have assumed that it would not be a particular help to the court, in view of the fact that I have not an intimate knowledge of such conditions hereabouts through this State. This is Mr. Grunsky's valuation alone, and I am simply assembling it.

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DIRECT EXAMINATION BY MR. GREENE.

Referring now to the Peninsula properties: There follow then the easements primarily those over the Mills and Easton properties, the Crystal Springs to San Andres flume, the Pilarcitos pipe and flume at San Andres, and the electric booster power line, those figures being rounded off from the figures submitted by Mr. Radle; under No. 7 is given the value of the Peninsula watershed properties, covering 17,926 acres, amounting to \$2,528,000, being the average of Baldwin's and Hoag's figures, and of Rodger's, as well, wherever he valued

the property, that is, where he made valuations of the property, it is the average of the three witnesses, instead of the average of the two witnesses.

I took the same watershed properties in use there as Mr. Hazen did. The purchase and ownership and use of these properties has seemed to me reasonable and desirable. Believing, as I do, that these Peninsula reservoirs will be used virtually for all time in the supply of the city, it seems to me desirable for their protection to hold the lands free from residences as long as this may be practicable. The time will no doubt come when it will be thought desirable to purify the water by filtration, or some such process, for the safety of the public, but that time has not yet come, in my judgment.

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There followed then the San Mateo properties, the Millbrae pumping lot, the Millbrae standpipe lot, and the Silva Tract, the values being taken as the average of the figures of Mr. Baldwin and Mr. Hoag, amounting to \$23,000, \$52,000, and \$91,000, respectively.

The Millbrae pump lot is in use for the pumping station, and the headquarters of the superintendent, and for storage yards, and so on. The standpipe lot is in use for a right of way, and for the standpipe line leading to the city. The Silva Tract lot is in use for a right of way for the main pipe line coming to the Millbrae pumping station.

Then follow the rights of way upon the San Andres pipe line, the Baden Tract of 8.85 acres, \$9,000; the Abbey Homestead lot, 1 $\frac{3}{4}$ acres, \$2,000; the Baden-Merced right of way, 43 acres, \$114,000, this latter being the cost of the right of way purchased in the years 1904 to 1907, and certain easements amounting to \$185,000 these being on the right of way of the pipe line. The Baden Tract, and the Abbey Homestead lot figures are the average of the Baldwin and Hoag estimates; the Baden-Merced right of way was taken at cost, and the easement figures are those of Mr. Radle after making the necessary deductions.

Mr. Sharon: The deduction as shown on page 5 is taken up mostly by streets.

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Mr. Metcalf: Where lands which were originally bought by the company have since become public ways, we made deduction of those lands from the reproduction cost estimates, on the theory that if the plant were being reproduced, it would not now be necessary to purchase the right of way across the highway. Where it was on private property, we included the private property, even though it was parallel to the street, as the street existed today.

Mr. Sharon: The valuation as made by Mr. Radle included valuations on properties which have been valued by Messrs. Baldwin and Hoag, and in order to avoid duplication, a deduction was made from Radle's estimate of \$206,000 for those properties that were valued by Baldwin and Hoag, and also for the list of streets which were included by Radle; those deductions amount to \$21,000; that left a valuation

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of \$184,712 as the remainder of the San Andres pipe line right of way which was valued by Radle.

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Mr. Metcalf: We come now to the Crystal Springs pipe line South San Francisco lot, \$54,000, that having been the cost in the year 1907. I took that cost because it was within the period, and it seemed to me that was the best evidence of value as of that date.

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This reproduction cost estimate is as of December 31, 1913. In the case of the easements, Mr. Radle's estimate was \$37,352; the amount here used, \$13,000, the difference growing out of the fact that a large number of streets have been cut through this locality on lands which were originally purchased, or where easements were purchased by the company. The details of the deductions are shown on page 4 of this exhibit, under the caption "Crystal Springs Line".

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The next item is the miscellaneous Lake Merced force pipe, Daly Hill line, over which the force main passes, which was valued by Baldwin and Hoag at approximately \$4,000; I have rounded off the figures in all cases to the nearest thousand dollars; and the easements from Lake Merced to Honda, upon which are located the pipe lines or flumes at \$50,000, as valued by Mr. Radle; the San Mateo Screen Tank, upon which is located the screen tank and measuring weir by which the water is delivered to the San Mateo Waterworks, valued at approximately \$1,000 by Baldwin and Hoag. Then we have line 22, Alameda system, the Belmont pumping station, 44.67 acres, \$28,000, being the average Baldwin and Hoag estimate, and the San Carlos lot, which was, I think, \$250, which is ignored here as being less than \$1,000, although it is in use. The Ravenswood land, 106 acres, \$13,000, these being out of the total tract of 1,846 acres, and the amount being based upon Baldwin and Hoag's figures; this covers the strip between the railroad track and the pipe line, and a margin of perhaps about 300 feet on the other side of the pipe line from the location of the railway. Then the Niles to Dumbarton right of way, along which the Alameda pipe line is laid, and the easement extending from what has been called here Pleasanton to Burlingame; in other words, to connect with the main pipe line laid along the county road, Mr. Radle's figures being used, amounting to \$39,000.

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Mr. Sharon: That is not the Ravenswood-Belmont right of way.

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Mr. Metcalf: This excludes any right of way along property which is owned by the company, which has been included otherwise; that is, lands which were valued by Gale and Schween.

Now comes the Calaveras Reservoir lands, covering 1,927.8 acres, valued by Mr. Grunsky at \$385,000; these are the reservoirs which will be overflowed by the dam which is now under construction, and here I have taken Mr. Grunsky's figures. I have used the same subdivisions used by Mr. Hazen on the Calaveras watershed lands tributary to the basin, including the Upper Alameda lands, which will become tributary

to the Calaveras Dam by the construction of a diversion dam on the Alameda, and tunnel connecting it with the Calaveras. Those lands amount to 15,946.69 acres, as valued by Gale and Clayton, and by Parks, as to certain of the lands, at the sum of \$432,000, the average of those values being taken.

10,368 Then follows what is designated here the Calaveras riparian lands, lying below the dam, and between the Alameda Tract and the Sunol lands, which I have regarded as tributary to the Sunol supply, and which are riparian to the stream, amounting to 2,550.98 acres, and of a value of \$64,000, as determined by Gale and Clayton; the San Antonio Reservoir lands, 656 acres, valued by Mr. Grunsky at \$46,000, on a basis of 25% in addition to the real estate value, using for the latter the average of the company's witnesses. The San Antonio watershed lands which are tributary to this San Antonio Reservoir location, 7,608.39 acres, \$230, being the average of the figures of Gale and Schween. The Arroyo Valle Reservoir lands, 630 acres, valued by Mr. Grunsky at \$19,000 on the basis of 25% excess over the real estate value determined by the company's witnesses. The watershed lands which are tributary to this reservoir site, 3824.5 acres, of the value of \$58,000, determined by Gale and Schween. The riparian lands below the reservoir site upon the Arroyo Valle, consisting of two parcels, 247 and N-268, amounting to 378.87 acres, valued at \$35,000 by Gale and Schween. As to all of these reservoir lands, it has seemed to me that as a matter of policy a certain latitude should be allowed to the company to purchase lands of this sort, looking forward to the future business of the company, and that it was advantageous from the public point of view to allow such latitude. Personally, I do not believe that it would be possible today to reproduce the Peninsula system at any cost which could well be met if those lands had not been acquired years ago by the company; while the probabilities of the utilization of these lands which will later become reservoir lands, by the public, is not nearly so great across the bay, because other sites are available, these sites are exceedingly advantageous to the company, and lend themselves advantageously to the development of this Alameda system, and the amount involved in the carrying of these lands is not, as I view it, heavy in comparison with the advantage which I believe will accrue to the company and to the public from carrying them. If the other policy is adopted of forcing corporations to carry any property which 10,369 is not actively in use, in the sense of already having been developed fully and put into active use, it will increase the hazard of investment, and will result in the necessity of paying a higher rate of return upon that investment, upon that rating base so determined.

Questioned by Master.

I excluded the lands on the west slope of the peninsula, because those lands are not directly tributary to the water supply, and they

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might reasonably be sold off. The lands are sufficiently large in area so that that could be done without disadvantage to the operation of the system as a whole. I have no doubt that it was advantageous to purchase them at the time that they were purchased.

Questioned by Mr. Searls.

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I have not, thus far, made any study of the relation between the revenue from the Alameda watershed lands and the Pleasanton ranch lands, and the operating costs and taxes upon them. I am not sufficiently well informed on the agricultural situation to know what would have been the result if the company had developed its agricultural resources; it might be that the burden of the expense might have been somewhat decreased in San Francisco; it is rather unusual so far as my observation goes for water companies to engage in the agricultural pursuits to a large extent, except in-so-far as may be necessary to actually protect their water rights.

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(The question of the utilization by the company of some of its most expensive lands for agricultural purposes was discussed by the Master.) 10,371-72

Mr. Metcalf: Upon the Pleasanton Well lands I have taken the average of the estimates of Gale, Schween and Mortimer, amounting to \$440,000 for the 951.67 acres. These are the lands at the lower end of the property, within which the driven wells are located. The next group covers the same group referred to by Mr. Hazen as the underground reservoir lands, of 4,657.94 acres, the cost of which in the years 1910 to 1911 was \$1,546,000, the reproduction cost estimate being \$1,576,000, and finally, under the Pleasanton group we have the riparian lands lying at various points below, comprising 702.02 acres, valued by Gale and Schween at \$74,000.

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With reference to the situation at Pleasanton, I have been influenced in a measure by the conditions with which the company was face to face. The company was facing low-water conditions, with a danger of shortage; it was the most reasonable source from which to get additional supply, and at comparatively small expense, and the ultimate development of the Pleasanton Gravels bade fair to be advantageous, and will be advantageous in years to come as a source of supply, particularly to carry the company over the times of extreme drought, and the peak loads which it has to carry. The company was, at that time, facing suit following the lowering of the ground water table in that region, and it was desirable for it to purchase the lands necessary for it to control the situation, and having purchased the lands for that purpose, it seems to me reasonable that they should be included in the reproduction cost, and in the rating base. As a matter of policy it is reasonable, and it should be possible to resell those lands when arrangements have been effected in this region with the property owners who will be most seriously affected by the lowering of the ground water table in this valley, but I doubt

if the company could advantageously have sold the lands immediately after purchase ex rights, and it seems to me that it pursued the natural course in holding the lands until the negotiations which are now pending had been finally carried through.

10,374 · What the ultimate cost of these water rights may be, no man can say. It seems to me unquestionable that the amount which the company would have paid for the water rights, even though the lands had immediately, or within a reasonable length of time been sold, regardless of the further negotiations, would have been a substantial percentage of the amount of the cost which was actually incurred, and it would not have been possible, I believe, to sell the lands immediately, without virtually doing so on a basis of forced sale.

Questioned by Mr. Searls.

I have heard more or less about the litigation which threatened just before the lands were actually purchased. I was not here at the time that these negotiations leading to the purchase of the lands took place. I got that simply through the officers of the company.

10,375 Had the attempt been made to purchase the water rights without actually purchasing the lands themselves, a very substantial sum would, in my judgment, have been paid for those water rights. As to whether the course pursued by the company will finally result in the lowest cost of the water rights certainly cannot be told at this time, but it seems to me that the course which was pursued by the company was a natural one, and not an unreasonable one, and having actually paid for the lands, it seems to me reasonable to include them at their full value in the rating base, for a period of perhaps two years, even though some allowance should be made after that time on the assumption that they might, perhaps, have sold out a portion of the lands during the latter part of the interval involved in this rate suit.

My comment applies to item 37, \$1,546,000.

10,376 Questioned by Mr. Searls.

10,377 I regard the advantage to the company of actually being able to utilize this big gravel basin in the same way as you would a surface reservoir, only as an underground reservoir, as of great importance to the company. If the company had gone to the owners, and had bought the water rights, covering the right to deplete the storage reservoir in any way, that might have proven desirable in later years, there would have been exactly the same situation as there is here. I have been looking upon it as implying not only that the company was getting the right to the water which would otherwise have found its way into the stream by the overflow of this cup, so to speak, but also the right to actually lower the level of the water in the cup so that it could utilize the storage capacity of the gravels. If the water right does not cover that, then it would not be the same condition as it is here; in other words, I assume that the right to the water which

would have overflowed the lip of the cup, whether it came down through a pipe, or through a stream, could have been exercised at Sunol. The right, on the other hand, to deplete the storage below the level of the lip could not have been exercised at Sunol. 10,378

It is not correct to say that the company did not have the capacity during high water in Alameda Creek to take it. It involved actually lifting by pumps the water out of this storage reservoir to a point where it would not have overflowed, and have come down to Sunol, which is quite a different thing.

There might be records showing the amount of water which flowed over the lip of the cup and how much was drained from the reservoir below the lip of the cup. Mr. Herrmann would know about that. I have not made such an actual separation.

The amount of overflow from the reservoir would not be limited solely to winter but would take place throughout the season in varying amounts.

As to the lands which the company owns in fee in the Livermore Valley, the statement that the taking of the water would benefit the land by taking the surface water off it in winter, if they pumped then, and in summer time it would deplete the gravels and damage them to a certain extent, is true only with respect to those lands which were marshy or submerged, it would not be true of the lands with reference to which the ground water table was located in such a way as to make agricultural operations easy and profitable.

Whatever was flowing in Laguna Creek would flow into Sunol— 10,380
there would be some underground flow during the summer months, but of course, the visible flow would be very much lessened, undoubtedly. The water overflowed the edge of the cup, and flowed through the sand or gravel in the valley itself underground, and would, of course, reach Sunol, too; with the slope there is in that valley, there must have been water flowing there in that way in the summer season; I feel confident of that. 10,381

The utilization of the storage in the Livermore Valley underground reservoir would not be accounted for by the measurements at Brightside weir.

My feeling about whether you could have an underground water right without utilizing the storage was that whatever name you call it by, it was desirable for the company, facing the situation that it was, to be able to get water by lowering the ground water level within these storage gravels, and in my judgment, it will be desirable in increasing measure with the lapse of time for the company to be able to utilize the underground storage of those gravels; it will tend toward conservation of the water, because the evaporation, amongst other things, will be less. Had the company done that, it seems to me it would have been liable to damage suits; it would have had to pay either for the lands, or for damage done, in order to be able to

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extract the water in that way. The ability to do that, of course, enables the company to divert a larger percentage of the storm runoff, because of the fact that the storage lands would be replenished during the wet seasons which might follow. It seems to me in a situation of this sort that reasonable latitude should be allowed a corporation.

If it is allowed to the corporation it can anticipate the conditions before they actually arise. I think it has been the general experience of the corporations that under those circumstances the cost of acquiring what it is necessary to acquire is less than if the bills are paid after the damage has actually accrued.

The parcels of land making up these various subdivisions are shown in Plaintiff's Exhibit 166 which was introduced by Mr. Hazen or by Mr. Sharon.

With respect to the Pleasanton riparian lands, those lie between the Pleasanton Well lands and the Sunol lands. Amongst them is the Nusbaumer Tract, which abuts upon the stream and is riparian; these lands are of advantage, primarily, on account of the riparian rights, and also in a measure to control the quality of the water; that is, they help in that way. They are in the same general category as the Calaveras riparian lands which lie between Calaveras Dam and the Sunol Tract, and which also tends to preserve the quality of the water, and also prevent adverse claims against the company, or will prevent adverse claims against the company when it actually diverts the water at the Calaveras Dam.

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Questioned by Mr. Searls.

There is this distinction, that the company is already diverting at Pleasanton, but has not yet diverted at Calaveras, except as the Calaveras water has flowed to Sunol. The Calaveras land has been of advantage to the company, and will be of advantage in the control of the watershed in its bearing upon the quality of the water, but more particularly in the ability to make the reservoir, and to actually divert the water at the dam. The plans were actually executed, and bids had been asked for by Mr. Schussler on the construction of a dam just prior to the time of the earthquake and fire, and as a result of that disaster, the construction was postponed. The lands upon the site of the dam had actually been entered upon, and work done in the driving of tunnels to check the character of the material. The active construction of the dam began within this period of years in 1913.

Some of the first borings were made in about 1875, but about 1907 further investigations were made; then quite an extended set of examinations were made, and tunnels were driven at the suggestion of Mr. Freeman, who reported to the company in 1910; it was about that time which led to the relocation of the site of the dam at a point above that originally selected for the dam.

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Here, again, is involved the question as to public policy. It seems to me that it is a wiser policy to permit the company to reasonably anticipate the future needs, and to include property of this sort, as in the case of the Calaveras Dam. It seems to me that it is reasonable to include in the rating base of the years under question the actual cost in building the structure, although the final water which will be held back by that structure was not available until after the period of rating in question. 10,384

Questioned by Mr. Greene.

I mean available through a separate pipe line. That water can be let down from time to time and utilized at Sunol, and is, as a matter of fact, and a portion of it running off from the Calaveras watershed has actually been used throughout this period of years; I had reference, when I spoke, to the inclusion of the structure of the dam, rather than the lands upon which the dam and the reservoir lie.

The same thing is true in a remoter degree with respect to Arroyo Valle and the San Antonio Reservoir sites. Personally, I have the feeling that it was prudent for the company to acquire those reservoir sites, and to hold them for the use of the public hereafter. The actual construction of the dam, of course, will not follow for several years. Under that method of procedure, I believe that the ultimate cost of development to the public will be less than if the other method were followed.

Questioned by Master.

Those areas have to do with the protection of the supply. It is advantageous for the company to be able to control and police the watersheds which are tributary to its supply. It becomes a question of how far it is reasonable to go in controlling the entire area. Obviously, it would not be desirable from the point of view of the public to attempt to control the entire watershed of all these streams at the present time, because that is not necessary, and the use is too remote. You can accomplish the same result by different methods. The amount involved in the lands which have been included in this reproduction cost estimate, which come within this discussion, is comparatively small. I think it is doubtful if you could justify the inclusion of the Arroyo Valle lands on the score of protection of the watershed alone, if it had not a reservoir value, but as regards San Antonio, I think that would be desirable, because of its greater proximity to the collecting center of the company. 10,385

I come now to the Sunol system, where I have used the same division which Mr. Hazen used, the Sunol drainage gallery system, amounting to 5,572.89 acres, valued at \$581,000 by Messrs. Gale and Schween; and the other watershed lands about Sunol, amounting to 3000.46 acres, valued by Gale and Schween, and in part by Clayton, at the sum of \$150,000. The first tract is directly tributary to the under- 10,386

ground water system which is tapped by the Sunol galleries, and which is held back by the dam in the Sunol Creek near the railroad bridge. These lands are made up essentially of the dam tract of 200 acres, more or less, the major portion of the Hadsell Ranch, and the De Saissett Ranch, which makes up 4900 acres, or thereabouts, of the 5,572.89 acres, the remainder being along the bed of the creek. The other watershed lands include the lands tributary to this area, amongst them the Nusbaumer Tract, which lies along Laguna Creek, and I think in this was the Stone Tract, too, which is riparian to the stream; the former of these cover not only riparian rights, but certain lands which were bought originally to prevent picnicing on the stream, and to make the policing of the stream somewhat easier. Of course, the use of the upper portions of those tracts is more limited than the lower portions, which are more nearly tributary to the drainage areas, and there, again, the amount involved in the aggregate of all these lands is not large, and I have included it in the reproduction cost estimates.

We come now to the Niles Canyon lands, excluding the riparian lands, comprising 629.86 acres, and a value of \$22,000, being the average of the estimates of Gale and Schween. These are exclusive of riparian lands along the stream bed, which were considered by Mr. Herrmann and Mr. Anderson, in their discussion of water rights; they are useful, and have been useful, primarily, as rights of way, and as giving points of entry into tunnels during their construction, when headings were made at various points along the tunnel, to make possible the construction of the tunnel from several headings. The lands run up on to the slopes above these, however. They are in the same general category as the other watershed lands with respect to the portion of the lands which lie up above the rights of way.

This makes a total of lands amounting to 72,894.54 acres, excluding the areas of the rights of way, and the valuation covering them is included in the total amount of \$18,243,000, excluding allowance for overhead or interest-during-construction. According to my view, there should be included in the reproduction cost of such tracts of land an allowance for overhead and interest-during-construction charges, which would have to be met if the work were reproduced, and which actually had to be met when the works were originally built. For such an allowance, I believe, 3% to cover overhead is conservative, and for the interest-during-construction, an allowance of 12%, in as much as the major portion of the lands would have to be bought in advance of the carrying out of the project in order that advantageous prices would be realized, and adding those overhead costs, it would bring the total amount to \$21,045,000. On the other hand, in considering this property as a whole, I have made deduction of the overhead and interest-during-construction allowances upon the land upon the theory that lands have been long in the hands of the corporation, and have appre-

ciated very markedly in value, it seemed reasonable to absorb these costs in the increment in value of the lands, and I have so treated the subject when I have come to the determination of the rating base, but I think it may fairly be borne in mind, in reviewing the weight which should be accorded to reproduction cost in considering the fair value of the property, more particularly as to the lands which have been bought within a period of years such that there has been no appreciation in the value of the lands which could absorb those costs. In other words, if, in this particular situation, the lands had not appreciated in value, I am of the opinion that there should be included in the reproduction cost estimate an allowance for overhead and interest-during-construction. Without the overhead and interest-during-construction allowance, the total upon the lands and rights of way amounts to \$18,243,000.

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We come now to a consideration of the water rights owned by the company, and utilized at the present time in the service of the public. I have taken for this value substantially the value found by Mr. Herrmann and Mr. Anderson, corresponding in round figures to \$4,000,000; Mr. Herrmann's figures being \$4,300,000, and Mr. Anderson's being \$4,240,000, the amount corresponding to the present average daily consumption as of the year 1913, of 40 million gallons per day.

Questioned by Master.

In my discussion upon rating base, I have applied this rate of \$100,000 per million gallons of capacity to the average daily consumption during each of the fiscal years in question, so that the range of those values is from \$3,100,000 in the fiscal year 1907-08 to \$4,000,000 in the fiscal year 1914-15. I mean by that that the average daily consumption for the fiscal year 1913-14 was practically the same as for the calendar year 1913. The larger sums that Mr. Anderson and Mr. Herrmann reached were due to the fact on the Peninsula that they took the yield of the Peninsula sources, and upon the Alameda system they took the months of maximum draft from the Alameda side.

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I have assumed that these rights covered the right of diversion which the company holds, either through purchase or through use, including the rights on the Merced Lakes, the Peninsula system, and the Alameda system, the point of diversion of the Alameda system being at the Sunol Dam, and quite independent of the right, or such right as the company has acquired, to lower the water level, or to make use of the water storage capacity in the Pleasanton gravels; in other words, that this allowance for water rights is quite independent of the situation in the Livermore Valley.

We now come to the structures, as to which I have taken Mr. Hazen's figures upon the gross reproduction cost, including 15% overhead, and 12% interest-during-construction. I have already stated my familiarity with the property, and with his figures as they were made, and such part as I played in the assembling of the data

10,390 for those figures, so that I feel that I have some familiarity with the basis of his estimate, which seems to me a reasonable one. To that is added the correction on his Belmont Pumping Station, "Plaintiff's Exhibit 97", Table 21, amounting to \$21,000, covering certain boilers, I believe, that was overlooked by him in the original inventory, and to which he adverted in his testimony. This makes a total of \$25,147,000.

10,391 All I wish to imply is that I had familiarity with his estimate in detail. Many of the things I worked up for him, or in conjunction with him. The data on valves I worked up, and the data on cast-iron I worked up—all the data for the local figures. I do not mean to say he did not exercise his judgment. We discussed the pipe laying prices. I checked his final figures on the basis of per mile cost, and separating the total figures of \$13,000, or \$14,000 per mile into the component elements of cast-iron pipe, the work of laying, the obstructions, the meters, and so on, and compared those with other results I had, and I found them fair. As a result of those checks on different branches of his estimate, I accepted his figures. I don't want to deny Mr. Hazen his own point of view; I know he has his own point of view, and I thoroughly respect it. I do mean that I checked the estimate quite independently at various points in connection with the work he had done, and I am content to stand or fall by his figures.

10,392 I then deduct the depreciation found by me, the accrued depreciation, \$3,496,000, leaving a balance of \$21,651,000. From this I deduct the difference between the agreed items, and Mr. Hazen's estimate upon those items, including the overhead and interest, and applied depreciation; those amounted to \$295,000; also the paving over supply mains outside of the city, to which he referred—\$36,000. Next I took out the portion corresponding to Mr. Hazen's valuation of the paving over mains, which was not actually cut in the laying of mains, the amount being determined by deducting from the total inventoried quantity the amount of paving which was agreed to with the City as having been cut in the laying of the pipes, making a net deduction, after applying the overhead and interest costs, and depreciation deduction, of \$1,328,000. The agreed paving which was cut in the laying of the pipe system was \$223,000. The paving over supply mains, \$36,000, is not agreed. That was taken out by Mr. Hazen on the same theory.

Mr. Sharon: The \$36,000 is Mr. Hazen's estimate of paving over the supply mains out of town.

10,393 Mr. Dillman: My estimate on that is \$36,960.

Questioned by Master.

Mr. Metcalf: Depreciation 5.92% was the average depreciation allowed upon this portion of the system. That is not stipulated. This is my figure, not Mr. Hazen's.

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The next is the clay dam, \$16,000, making total deductions of \$1,675,000, leaving a net or depreciated reproduction cost of structures in use, \$19,976,000. This includes the agreed allowance upon inventoried stock on hand, materials and so on, of \$289,940, and finally, there is to be added the going value, \$3,400,000. I have not working capital in there. This is not my rating base it is the reproduction cost estimate. These various sums are then added together, amounting to, and including the 3% overhead, and 12% interest-during-construction upon the lands, \$48,421,000, and excluding this overhead and interest-during-construction upon the lands, it amounts to \$45,619,000. Upon pages 4, 5 and 6 are shown the adjustments in Mr. Radle's right of way, to which allusion has already been made.

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I come now to a consideration of the value of the property, as based upon the bond and stock quotations upon small sales of securities in the past. While I do not personally believe that the results found by this method of valuation have significance here, for the sake of completeness, I have assembled them. The reason they seem to be of little significance here is to be found in the fact, first, that the sales have been very small in magnitude; at no time during this period has a controlling interest of the property been involved. Moreover, the conditions which have existed between the City and the Water Company have been such as in my opinion to do away with natural market conditions. In other words, it does not seem to me that it can be said that fair market conditions have prevailed during this period of time.

("Value of the property, based upon bond and stock quotations, 1907-1915," introduced and marked "Plaintiff's Exhibit '200'.")

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There are frequent sales, but not sales of large magnitude. The investment in the property, I understand, is largely local. That is, the property is owned largely within this state, and probably within this city.

These figures are based upon information reported in Walker's Manual of California Securities. On page 1 is given for each of the calendar years a statement of the bonds outstanding, and month by month the high and the low quotations for those bonds, at an average of these high and low quotations for the year. Similar figures are given for the stock, and similar averages are submitted. That is, the average for the year as determined by averaging these monthly high figures and the monthly low figures.

On the second page is a summarized statement of these results, based upon the stock and bond quotations upon small sales applied to bonds and stock outstanding as of June 30th and December 31. In column 1 is given the calendar year; in column 2 the bonds outstanding as of June 30th; in column 3 as of December 31, and in column 4 the stock outstanding throughout the year. In column 5

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the value based upon the quotations for June; in column 6 for December upon the stock; the average for the year in securities outstanding as of July 1st is shown in column 7, and as of December 31 is shown in column 8. From column 8 the amounts thus resulting vary from \$21,510,000 in the year 1907, the low point, to the high point in 1912, \$37,670,000 on December 31, and \$37,390,000, the basis of securities outstanding July 1st; the amount as of 1915 being approximately \$36,210,000 as of December 31.

The difference between columns 7 and 8, and columns 5 and 6, grows out of the use of the average price for the year of the stock, as determined from the high and low amounts, instead of the prices prevailing actually as of the dates June 30, and December 31. Column 5 is not an average of columns 2 and columns 4, but the value based on the quotations as of June 30. The amounts shown in columns 2, 3 and 4 were included merely that his Honor might have before him at the same time the amount of securities outstanding upon those different dates.

10,397 On page 3 are the values as obtained from the quotations for sales in the month of June. In column 1 is the year; in column 2 the bonds outstanding; in column 3 the average quotation upon the bonds in June; in column 4 the product resulting from multiplying the safe value of the bonds outstanding, shown in column 2, by the average quotations shown in column 3. A similar computation is then made for the stock outstanding; in column 5, \$28,000,000 outstanding in the year 1907, the average quotation during June being 19.6 the product resulting from multiplying the stock outstanding, shown in column 5, by the average quotation in June, shown in column 6, being \$5,500,000. The sum of the two amounts of the two products shown in column 4 for the bonds, \$15,200,000, and for the stock in column 7, \$5,500,000, gives the total of \$20,700,000 in column 8.

10,398 That then is the combined amount, based upon the sales in the month of June, and is transferred to the previous pages from column 5 for the year 1907. The same method is followed throughout, giving the results for the year, and for the months of June and December. It is approximate in character, and not weighted for each of the sales. I did not attempt to take into account any particular consideration that might have affected the price at various times. I simply took the record just as it stood.

10,399 ("Metcalf's fair rating base and return for the Spring Valley "Water Co. property for each of the eight fiscal years, July 1, 1907, "to June 30, 1915," introduced and marked "Plaintiff's Exhibit 201".)

Mr. Metcalf: We come now to a consideration of the rating base. On page 1 of Exhibit 201 I have summarized the values arrived at

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by the application of different methods of valuation, or different yardsticks. We have first original cost.

(a) Of entire property, including allowance for Overhead and Interest, but excluding allowance for abandoned property and for depreciation and development expense (Pl. Ex. 170, Table B-2 Revised)	\$34,629,000
(b) Of property in use (only), excluding Overhead and Interest-During-Construction, Pl. Ex. 170, Table B-2 (Revised)	\$25,424,000
(c) Same, with addition of Overhead (10% on Structures and 2% on Lands) and Interest (8.88% on Structures and 7.7% on Lands) Pl. Ex. 170, Table B-2.....	29,460,000
(d) (Resulting) of property in use, with allowance for Overhead, Interest - During - Construction, Abandoned Property and Depreciation, but excluding development expense, Plaintiff's Exhibit 170, Table B-2	26,548,000
(e) Of entire property, less Abandoned Property and Depreciation on Existing Property, including 2% annual appreciation allowance on Lands and allowance for Development Expense based upon Rates corresponding to Fair Cost of Money to Spring Valley Water Co. Plaintiff's Ex.	36,831,000
2. INVESTMENT OF BOND AND STOCKHOLDERS', excluding any profits Reinvested in Property:	10,400
(a) Without accounting Deficits, without allowance for interest upon investments during year of investment, Pl. Ex. 12-BB.....	27,526,000

(b)	Without accounting Deficits; with 6 months' interest allowance upon investment during year of investment, Pl. Ex. 12-BB.....	28,657,000
(c)	With allowance for Deficit and Excess in Earnings below or above Fair Cost of Money to Spring Valley Water Co. Plain- tiff's Ex. 12-CC.....	40,382,000

Questioned by Master.

The difference between heading 1, original cost, and heading 2, investment of bond and stockholders, is that the first relates to the money which actually went into the property in the shape of the cost of the structures and the lands, and the re-invested earnings during this entire period of time; the second relates to the cost as represented by what the bondholders and stockholders paid for their securities at the time of the issue of those securities.

Questioned by Mr. Searls.

10,401 In item (b) of the first group we subsequently take out the property that was abandoned, or that went out of use.

10,402 The first classification, which is headed, "Original cost", was made up on the basis of determining, so far as possible, the actual amount of money which the company put into the property itself; the second classification, which is headed "Investment of bond and "stockholders", excluding any profits re-invested in the property, is the investment of the bond and stockholders in the company. Mr. Searls was asking what accounts for the difference in the two. My memory is not clear enough to go back over this long period of years and remember the computations which I made, in order to answer his question specifically. In approaching the matter from these two entirely different sides, there is no necessary relation between them, except of a most general sort.

10,403 If you take the total investment, \$27,526,000, and add to that the undivided profits and floating debt, then the difference between that and \$25,000,000 ought to cover principally the original cost of the property that has gone out of use, and which was not included here, and also property that has never been put into use. It is made up principally of that.

10,405 3. NET OR DEPRECIATED REPRO-
DUCTION COST:

(a)	Lands, including 3% Overhead, 12% Interest-During-Construc- tion	21,045,000
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(b)	Water Rights, excluding Overhead and Interest	4,000,000	
(c)	Structures, including 15% Overhead, 12% Interest less deduction of \$3,496,000 plus \$83,000 for depreciation	19,976,000	
(d)	Going Value	3,400,000	
	Total Net or Depreciated Reproduction Cost	48,421,000	
(e)	Total Net or Depreciated Reproduction Cost, excluding Overhead and Interest allowances upon Lands and Rights of Way..	45,619,000	
4.	VALUE ON BASIS OF SMALL SALES (but never a controlling interest) of Bonds and Stock, during the period, 1907-1915, in which the Spring Valley Water Co. has constantly been in litigation with the city and during which normal market conditions cannot be said to have existed (Ex. 200) range from	21,500,000 to 37,670,000	10,406
5.	METCALF'S ASSUMED FAIR RATING BASE, as of December 31, 1913	\$43,600,000	

As to this amount of \$43,600,000, excluding the working capital, I can only say that it is the result of the exercise of judgment in view of these various investigations which have been made. The original cost of the property does not give any measure of the appreciation in value of the lands, or of the value of the waterworks property as a whole. The reproduction cost estimate does give weight to the increase in cost of structures due to changes in labor conditions, and the price of materials, but it does not give any measure, whatsoever, of the general character of the property as an operating unit. It does take into consideration the appreciation in land values since the original purchase of the plant, and makes an allowance for the cost of establishing the business, or the difference between the property with an established revenue, and a similar property newly built, without such revenue attached to it, or such business attached to it. Furthermore, the reproduction cost, as here

10,407

shown, does not show the reproduction cost of the entire property, but only such portion of it as is in use in the service of the public, and does not give weight in the water rights, for instance, to the entire property which the company owns, and which will, sooner or later, be in the service of the public, and which is now held for that future service.

The property as a whole has had a unique history, and I am of the opinion that it could not, as a matter of fact, be reproduced today as it stands for the figures shown in this reproduction cost estimate. That is, in all of its parts specifically. It seems to me highly probable that if the foresight which was exercised by the company had not been exercised in obtaining these lands and water rights in advance of the actual needs of the community, the Peninsula, for instance, would have developed in such a way as to make it financially impossible at this date to reproduce the property. The works, as a whole, have been built very substantially, and have a splendid record of service behind them.

10,408

As to the quantity of water which was delivered during this period to the city, I admit that in pressure, particularly, and perhaps in some cases in actual quantity within certain districts of the city, notably the Richmond District, the service was not as good as was desirable, or as it should have been, but those conditions grew out of the situation which has existed between the Company and the City during this period. The source of supply, on the other hand, were ample, and will take care of the future needs of the City for many years to come, at least for a period of 20 years, perhaps for a period of 30 years. In arriving at the rating base, I have excluded from the rating base the cost which would be involved in cutting the pavement incident to the laying of the pipe in the streets today, following the recent ruling of the United States Supreme Court in this respect. I believe, however, that from the point of view of market value, using the term as applied to the price at which the property might be sold to a willing buyer by a willing seller, that additional value would be given to the existence of those pavements over those mains. As a measure of the additional value, it may not be unreasonable to use the cost of cutting the pavements and replacing them, even though they were not originally cut by the company in the laying of its mains.

In view of the very unusual situation, which is without parallel in my experience, with respect to the Merced lands, and in view of the extent of the holdings of the Alameda system, it seems to me it is reasonable to make some allowance from the reproduction cost of the property. I have not been able to figure out to a nicety what that should be, and I don't know how it can be done. I have only been able to sum it up as a matter of judgment, and have arrived at this figure of \$43,600,000, as I did substantially a year ago, as a

matter of judgment. It involves a reduction of approximately 5% from the entire value of \$43,619,000, or, if you consider as I do, applicable rather to the elements of value other than the structural plant, it amounts to approximately 9% to 10% of the value of the lands, rights of way, water rights, and going value during this period. If you apply solely to the lands and the water rights, it amounts to almost exactly 10% as of the year 1913.

I have applied this same proportionate reduction to my rating base for the several years involved in this suit, starting with the sum of \$43,500,000, plus \$100,000 working capital, as of the year 1913, or the fiscal year 1913-14. The lands, excluding overhead and interest-during-construction then amount to \$18,243,000; the structures, including the 15% overhead, and 12% interest-during-construction allowance, amounts to \$19,976,000; the water rights to \$4,000,000; the going value to \$3,400,000; making a total of \$45,619,000, plus working capital \$100,000, making a total rating base, based on reproduction cost, of \$45,719,000, from which the deduction is \$2,119,000, reaching the round sum which I have previously referred to of \$43,600,000. To this, for the fiscal year 1914-15 has been added the construction account in lands and structures, the water consumption remaining the same, and the water rights, therefore, being valued at the same amount, the going value being kept at a figure slightly less than the year's gross revenue, making a total of \$45,732,000, plus \$100,000 working capital, or a total rating base of \$45,832,000, from which has been deducted a pro-rata amount of \$2,132,000, giving an approximate rating base of \$43,700,000.

10,409

Similar computations were made for the years 1907 to 1912; the real estate values shown in the item 1 being decreased in accordance with the stipulated percentages for the various areas covered by those stipulations, and being further modified by the actual purchases of real estate. The structures were modified by the actual additional structures put into service, with a deduction for the depreciation allowance each year, the depreciation allowance varying from \$205,000 at the beginning of the period, to \$261,000, I think, in the year 1912-13. These amounts are as follows:

\$205,000 in the year 1907-08;
215,000 in the year 1908-09;
224,000 in the year 1909-10;
234,000 in the year 1910-11;
249,000 in the year 1911-12;
261,000 in the year 1912-13;
279,000 in the year 1913-14;
294,000 in the year 1914-15.

I might say, with regard to the depreciation allowances, that those were the allowances which I got when I made these computa-

10,410

tions early last fall, by the application of the equal-annual-payment method. I did not revise them, because the computation incident to correcting for the properties bought and sold, and put out of use during this period of years, and the structures also, was extremely involved, and it did not seem to me that the difference was important enough to re-compute them.

ONE HUNDRED AND FORTY-SECOND HEARING.

APRIL 21, 1916.

Witnesses: LEONARD METCALF for Plaintiff.
H. H. WADSWORTH for Defendants.

Witness: LEONARD METCALF for Plaintiff.

10,411

Questioned by Master.

10,412

Mr. Metcalf: In regard to the supposition that my preliminary assumptions taken from other witnesses are incorrect, that the real estate men were too high, or that the right of way man was too high, or that the water rights men were each too high, so that my final figures would be lower, and assuming that other conditions remain the same: So far as a reduction in the values which might be arrived at by your Honor upon the lands and right of way, as compared with those which I have assumed in making up the reproduction cost, if this, coupled with the finding upon the value of the water right, were less than the amounts which I have assumed in the reproduction cost estimate, of course, by the allowance which I have made from the reproduction cost estimate to my rating base, then I should decrease the amount of my rating base. So far as the structures are concerned, I feel greater confidence, because I know more about the subject of structures, and I should not make a corresponding reduction in my rating base if the witnesses of the city, for instance, had found, as they did find, a substantially lower figure for the net value of the structural portion of the plant. In other words, I would give greater weight to differences in the real estate and rights of way findings than I should to differences in the structural values.

In making a reduction, however, in the rating base, to accord with such difference, I think probably that the rating base which I should assume would not differ from my present assumption by the total amount of that difference; in other words, there are other considerations of the general character of the plant, and of the service which it is capable of rendering, which do not appear directly in those figures. I should also have in mind the figures which have been adduced with

reference to original cost, without consideration of appreciation in value, to which must be added some allowance for appreciation in value, which, in itself would afford a lower limit under the conditions here prevailing, because I am confident that the reproduction cost estimate would be greater than the original cost figures. I have known two cases, I think, where the reproduction cost figures were actually lower than the original cost figures, and where I took a position on the question of value lower than the original cost, and the award was actually lower than the original cost. That does not often happen, however, because the general experience in waterworks in this country has been that the property values have appreciated substantially, but I should, as I said, make a reduction for my final finding if the values placed upon the lands and water rights were substantially lower than those which I have assumed, bearing in mind the reduction which I have made from reproduction cost to my rating base.

10,413

In the case of the Merced lands, which are valued at a large sum by reason of their residence character, I made a reduction on the capital value on that portion of the plant, for the purpose of reaching a rating base upon the theory that while the land might, with some allowance for over-estimate, be considered worth what I stated, that in any event, considering the nature of the service of that lake, there must be something taken off, because it was such an expensive piece of property.

10,414

As a basis of condemnation figures, in contradistinction to a rate case, the essential difference in value which I should find would grow out of the inclusion of all of the properties owned by the company. I have not given any thought to the question as to whether, assuming that the condemnation is only of the property used and useful, the company would be at a disadvantage in the sale of its remaining property; in other words, whether there would be any consideration of severance damage; but, assuming that there were no such considerations, then I do not, at the moment, think of any difference which I should make, except with respect to the consideration of certain of the lands, such as the Merced situation. I am inclined to think, under those circumstances, it might be that the company would be entitled to a closer consideration of all the market value of those lands to whatever use they could be put. It is my assumption that the market value for residential purposes would be somewhat greater than the value which I have given in my rating base for use in waterworks purposes. So far as reduction for possible error is concerned, I do not think of any reason why one should be different from the other.

Questioned by Mr. Greene.

In case where lands were included by me, at a cost which was arrived at from 1907 to 1911, and the appraisal was of 1913, and there was a difference between the value in 1913 and the cost, then I think

10,415

there would be a distinction between a value for rating and a value for sale purposes, unless I was satisfied that the actual cost figures were in fact a fairer measure of the value of the property than the estimates now made by other men. It would seem to me that so far as the rating proceeding was concerned, it was a fairer, and a more satisfactory procedure to use costs; under the other circumstances, I think the difference might fairly be considered and weighed.

If additional water rights were considered in the condemnation suit, the same theory and result would not obtain as that which I have used for the rating base in this suit. If the entire water rights were being taken, they would be appraised at a higher value than the water rights in use.

DIRECT EXAMINATION BY MR. GREENE.

10,415½ I had reached the point of referring to water rights, shown on line 3, page 1, of "Exhibit 201", which were modified by consideration of the average daily consumption during the year in million gallons per day, the value being determined by applying the rate of \$100,000 per million gallons daily consumption during the year under consideration which gives a range of values of from \$3,100,000 in the year 1907-08 to \$4,000,000 in the fiscal years 1912 to 1915, the consumption being practically the same for the last three years stated.

10,416 The going value was modified by taking substantially one year's gross revenue during that period, which comports closely with the result found in the manner previously stated for the year 1913, the range of values being from \$1,900,000 in the fiscal year 1907-08 to \$3,400,000 in the last two years of this rating period, to-wit, from 1913 to 1915. I think I have already stated the way in which the deduction from the net production cost was determined. Adding these various amounts together, with an allowance of \$100,000 for working capital, and making the deduction stated, which deduction ranged from \$1,500,000 in the year 1907-08 to \$2,132,000 in the year 1914-15, I find the following rating basis: For the fiscal years:

1907-08	\$36,600,000
1908-09	37,200,000
1909-10	37,800,000
1910-11	39,000,000
1911-12	42,000,000
1912-13	43,100,000
1913-14	43,600,000
1914-15	43,700,000

On the following page, marked page 2 of Exhibit 201, is shown my computation of the net return earned by the company upon these rating bases from the fiscal year 1907-08 to the fiscal year 1914-15. On line 1 is given the rating base which is reported from page 1; on

line 2 we have operating expenses, revised from the figures first submitted by Mr. Muhlner, in "Plaintiff's Exhibit 124", in accordance with the segregation or the notes which appear on pages 3, 4 and 5. The accrued taxes are shown on line 3, and the depreciation allowance, excluding the suggested \$60,000 contingent depreciation allowance, ranging from \$205,000 for the fiscal year 1907-08 to \$294,000 for the year 1914-15.

10,417

That will be found in an exhibit which I shall put in, in a moment, giving betterments, additions and abandonments, year by year. It was made up last fall, figuring the depreciation on the equal annual payment basis, and deducting it each year from the value of the property in order to arrive at the rating base; it was based fundamentally on an allowance of \$260,000 in the year 1912-13, here shown as \$261,000. The computation is a more or less involved one, and required two or three trials, and when I got \$261,000 I thought I would stop without attempting to carry it to greater refinement. Adding together the operating expense, accrued taxes, and depreciation allowance, I have the total revised operating expenses, taxes and depreciation shown on line 5, ranging from \$1,163,000 in the year 1907-08 to \$1,530,000 in the year 1914-15.

If I included the \$60,000, it would increase each of those sums by the amount of \$60,000. The actual gross revenue, including the enjoined 15% excess over the 1902 ordinance rates, is shown on line 6, ranging from \$2,064,000 to \$3,483,000.

Questioned by Master.

If I had included the revenue, less the 15%, it would not have made any difference in figures. I have shown, on page 2-a, following on line 6 thereof, excluding the enjoined 15% over ordinance rates, and I call attention to the fact that in the year 1907-08 the amounts are the same, in as much as the laying aside of the 15% excess, or impounding it under the jurisdiction of the court, did not begin until the following year.

10,418

Mr. Greene: I think the table is in error, strictly speaking, as far as 1907 is concerned, because the \$2,064,000 includes whatever was collected in excess of the ordinance rates. We have agreed that the \$2,064,000 includes an excess of approximately 15%, or 12%, so that in order to make the tables comparable on line 6, page 2-a, there should be substituted for \$2,064,000 an amount less than that by about 12%. There was not any excess impounded in 1907-08. Mr. Metcalf is right if he sticks strictly to the impounded money, but there is a difference in the ordinance rate, and the rate collected in 1907, as well as in the following years.

DIRECT EXAMINATION BY MR. GREENE.

10,419

Mr. Metcalf: Referring now to the table on page 2; we have on line 7 the amount of net divisible revenue applicable to coupon in-

terest, dividends and reserve, being the difference between gross revenue, including the enjoined 15% excess, shown on line 6, and the total revised operating expenses, taxes and depreciation, on line 5. By "reserve" I don't include depreciation; it would have been better to have used the term "surplus" rather than "reserve", it would have been less ambiguous.

These amounts, together with the resulting percentage of net divisible revenue, shown upon line 8, based upon my fair rating base, shown on line 1, are as follows: For the years,

1907-08	\$ 901,000 or 2.5%
1908-09	1,361,000 or 3.7%
1909-10	1,564,000 or 4.1%
1910-11	1,682,000 or 4.3%
1911-12	1,792,000 or 4.3%
1912-13	1,847,000 or 4.3%
1913-14	1,846,000 or 4.2%
1914-15	1,953,000 or 4.5%,

the rate of return during the last six years ranging from approximately 4% to 4½%.

10,421

Mr. Dillman: In 1914-15 Metcalf gets \$3,483,000; the average for 1914 and 1915 in Hazen's is \$3,520,000—that is in the gross revenue. In the net revenue there is a difference. Since the operating expense and taxes are approximately 50% of the gross revenue, that would double the difference in the net so far as affecting the rate of return goes. I bring the question up, not so much to note any difference there, as to settle the question as to what I shall take as gross revenue, because I have no other data.

10,422

Mr. Metcalf: I will call your Honor's attention, and Mr. Dillman's attention to the fact that the exhibit which I shall put in shortly on the financial situation contains a tabulation showing the waterworks general statistics, in which you will find Mr. Hazen's figures, the reason being that those were based upon the calendar years. I found by comparison that they are identical with Mr. Hazen's figures, showing that the difference between his tabulation and mine grows out of the fact that he took calendar years, and I took fiscal years, following the requirements of the rate suit, and the suggestions of counsel.

On page 2-a are given similar figures, based, however, upon the assumption of a gross revenue, excluding the enjoined 15% excess over the ordinance rates. Mr. Greene has already called your attention to the error occurring in the year 1907-08, growing out of the failure to make deduction for the agreed excess there, for which I make correction; but beginning with the years 1908-09, and ending with the fiscal year 1914-15, the rates of return are approximately ¾ of a per-

10,423

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cent lower than those shown on the previous page, page 2, running from 3.2% for the year 1908, to 3.6% for the year 1914-15.

Referring to page 3, I have assembled there on the first line the operating expense as reported by Mr. Muhlner, in "Plaintiff's Exhibit 124", page 5, less the deductions which I admit are based upon the figures agreed upon with Mr. Ellis, and approved by Mr. Searls. I have excluded, however, the correction for the figures for which Mr. Searls, I believe, will contend, to-wit, the charges appearing as renewals, which he will contend, as I understand it, should have been accounted out of the depreciation allowance.

Upon line 2 are shown the construction charges admitted for the several years under question, which are shown in detail on page 4; for example, take the year 1908-09, construction charges \$1,811, shown on page 3; turning now to page 4, and looking in the column headed "1908-09", we find the item "bulkhead, Hadsell Ditch construction, "\$1,810". The other items may be similarly identified. On line 3 I show the eliminated charges; take the year 1910-11, \$12,194; turning now to page 4, we find under the eliminated charges "donations "\$6,194; Panama-Pacific Exposition \$6,000"; making up the total item of \$12,194. The other items shown under the eliminated charges on page 3 may be similarly identified. On line 4 are shown the water rate suit charges, as for example, taking the year 1910-11, \$36,552, shown on page 3; turning now to page 5, "Memorandum of doubtful "items", you will find, about the middle of the page, just below the first line, "In suspense, water rate suit, \$32,314; bookkeeping department, 15% records"—that is the actual cost of accounting the 15% which was collected and impounded under the jurisdiction of the court, \$4,238, making a total of \$36,552.

10,424

The condemnation suit costs, which are shown on the lower part of page 5, have been included in the operating charges. The water rate suit costs have been excluded.

Questioned by Master.

That is not an admission by the company that those were improperly included in operating; it was merely that I took out those doubtful items of water rate suit costs, and left in the condemnation suit costs which have already been incurred, and which constitute a closed transaction.

DIRECT EXAMINATION BY MR. GREENE.

So far as the water rate suits are concerned, I excluded those amounts for the purposes of my computations, at Mr. Greene's request. In other words, he wanted to have the computation without taking that into account, and leaving that matter to take up on argument.

Adding these corrections for construction charges, eliminated charges, and water rate suit charges, I find the sub-total shown on page 5, ranging from \$3,484 in the year 1907-08 to \$41,364 in the year

1914-15. These amounts I have deducted from the operating expenses reported by the company in "Plaintiff's Exhibit 124", shown on line 1, page 5, that is page 3 of "Exhibit 201", and obtained the corrected operating expenses shown on line 6, ranging from \$635,749 in the year 1907-08, to \$746,758 in the year 1914-15.

10,425 Questioned by Master.

10,426 The total expenditures, \$71,310, on the next line, has all been expended in connection with the condemnation suit, and that is all that has been expended in connection with it. The total amount of \$71,310, condemnation suit, and the further total amount of \$58,430 for other things relating to the Hetch-Hetchy matter, have been included in operating expenses. It would be well to draw a line underneath the \$71,310. As you will remember, evidence was given here by Mr. Herrmann, and perhaps by Mr. Muhlner, showing that certain of these investigations resulted in bringing up the records of the company which were missing, although the investigations were made at the time of the Hetch-Hetchy investigation. I have included in my operating expenses all of these items, but have shown them independently here, so that if you feel that any of the items should be excluded, the amounts are clearly set forth, so that you may exclude them.

10,427 I have shown here the salaries of the attorneys separately from the engineering department salaries on the report.

Mr. Sharon: The item of Sharon's expenses, etc., was for expenses incurred on a trip to Washington with Mr. Schussler. I went along with him in 1910, I think it was. It was in connection with the presentation of the company's side of the question to the Secretary of the Interior, at the time of the Hetch-Hetchy hearing. I think I was there six weeks.

10,428 Mr. Metcalf: I think when Mr. Eastman puts in the detailed table of all of those expenses, that these matters, perhaps, will be clearer, and that, perhaps, will be the advantageous time to go through them item by item. It is my understanding that these items here may readily be connected with that exhibit which will be put in later.

Questioned by Mr. Greene.

I included all of the items which are above the blue line, many of which bear the words "operating expenses".

Questioned by Mr. Searls.

I included them in the operating expenses. I would like to say that I got Mr. Muhlner to make up for me a memorandum of the amount of the renewals which were charged as an operating expense by us, and as to which I understand it will be contended by the city that they should have been charged to depreciation; they aggregate the total sum of \$82,000, the largest item being for the year 1909-10, amounting to \$41,985.21. Had I excluded those from the operating expenses on the theory that they were covered by the depreciation al-

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lowance, the effect upon my rate of return earned upon the rating base, as shown on pages 2 and 2-a would have been less than .1 of 1%, so that so far as this discussion is concerned, I think it is negligible whether you include them or exclude them.

10,429

Questioned by Master.

Turning to page 4; the items beginning with "Ornamental tables and garbage cans", and ending with the "Fence west of the Mission bridge"; I allowed the exclusion of. It is my impression that the garbage cans were so small a part of the total item, the bulk of the cost having been included in ornamental tables, that I added that all to the construction.

I was just going to take the year 1912-13 and check that up. Adding these figures, construction, \$399, \$244, \$1780, makes \$2423; add to that \$352, and \$460, and it makes \$3,235. The summation of the figures just stated corresponds with the items shown under the recapitulation, total construction, \$3,235, showing that ornamental tables and garbage cans, and the fence west of Mission bridge, were included in the construction cost, and were deducted by me, therefore, from the operating cost.

10,430

On page 6 I have prepared a statement showing the amount of the taxes and operating expenses, and of the total rents received upon the properties classed as out of use, by me, with reference to my rating base for the fiscal year 1913-14, which year was selected at random, simply because the method of accounting made it easier for Mr. Muhler to find what the amounts were for that year, merely to see how the operating expenses and taxes compared with the actual revenue received upon these lands. The lands are under the major groups of San Francisco County and San Mateo County properties, shown on pages 6 and 7; Alameda County and Santa Clara County properties, and Marin County property, shown on page 7. There is a recapitulation of these amounts on page 8, showing for the lands in the several counties the county assessment valuation, amounting to \$1,071,922.05; taxes \$23,630.90; operating expenses \$1,398.66; total taxes and expenses \$25,029.56; total rents received \$19,766.

10,431

Questioned by Mr. Searls.

This applies only to those properties that I have myself excluded from use, and it was this that justified my remark of yesterday that the difference between the revenue and the operating expenses, and taxes, upon the lands admitted by me as out of use, was but \$5,000, or thereabouts, a nominal sum. That does not include any amount for interest on that investment; on the other hand, I have excluded the capital sum from the rating base; in other words, I have not figured the net return which I get on the basis of a rating base, which included those properties. The rate-payers are not charged with making up the deficit in the net revenue resulting from the excess of all the

10,432 expenses over the rent, because that has been excluded from the rating base. The only effect would be on the \$5,000 item.

Questioned by Master.

The \$7,000 item below, on account of those lands, restoration of title, etc., was included as operating expenses; those were abnormal expenses.

10,433 As to whether the receipts and rents were larger in the latter part of this year, which I have selected as a typical year, than in the period of 1907, and thereabout, and whether the expenses were about the same, as to that I can only say that I have no reason for supposing that there is marked difference. Mr. Muhlner said that he could not give me the precise figures. Both Mr. Muhlner and Mr. Roeding thought that the difference with respect to these properties which I admit as out of use, were not a factor in determining the actual rate of return earned upon the rating base. If I wanted to be more precise than I have been in this matter, I could decrease my operating expenses, according to Mr. Searl's theory, throughout the period, by a lump sum of say \$5,000.

Mr. Sharon: The company's agricultural policy started in about 1909, and the development of the agricultural features has been largely on the lands around San Antonio, Arroyo Valle, and at Pleasanton and at Merced, which lands Mr. Metcalf has included in his rating base. I think, also, the Sunol properties are included. I think, that the only agricultural pursuits followed to any extent prior to that time were in the Calaveras watershed. That would tend to make the earlier period that we are discussing a period of greater discrepancy between receipts and expenditures, 1907-08 and along in there. The agricultural revenue from those properties has increased since 1908-09. Mr. Roeding came to the company, I think, in 1910, and prior to that there was Mr. Howell, who had charge of the department for possibly a year or so.

10,434 I do not think it was Mr. Schussler's policy not to do much agricultural development. I think so far as Mr. Schussler's policy was concerned in that respect, that that applied only to Merced.

10,435 (Counsel for Defendants suggested that they agree with Plaintiff on the character of the accounts to be taken, and then have the accountant go through the books for all these years, and segregate the revenue and operating, according to the general division of these excluded properties. Counsel for Plaintiff stated that that would be satisfactory to have that investigation made, and both Counsel agreed that prior to the argument a table be presented showing the correct figures on that subject.)

(A table of betterments, additions and abandonments during the rating period from 1907 to 1915 was introduced and marked "Plaintiff's Exhibit 202".)

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DIRECT EXAMINATION BY MR. GREENE.

Mr. Metcalf: Turning to the table headed, "Betterments of 1907", you will see I have shown there a list of the real estate purchases in the year 1907. I have grouped together the betterments in the form of real estate purchases, and structures added for each of the years under question, and wherever there were abandonments during the year, those have been shown by way of deduction at the foot of the column. At the end of each year is shown a brief summary, giving the total amount of the betterments as to real estate and structures. At the end is a table covering the deductions on account of real estate sales, etc., and one relating to the deductions from betterments on account of dismantled equipment, growing out of the fact that some properties were sold prior to the date of making the inventory, but were in use for a portion of the years at issue here, and so had to be accounted in this way. This data has been assembled in the tabulations which appear at the beginning of the exhibit, and which are summed up on the first two pages thereof.

10,436

On the first page is shown the basis of determination of value of the property of the Spring Valley Water Co., which is perhaps too comprehensive in the light of what has developed since. At the time I made up this table I was anxious to see how the structural costs, or reproduction cost estimate, as corrected for the changes within this 8-year period would vary throughout the 8-year period. On the first page of the exhibit you will see that the variation is very slight, if you make the allowance which I did on the equal annual payment basis for the deduction of the depreciation account. I found in general that the variation from the average figure, or the figure obtained for the year 1913, was less than 1%, the range being from 98.4% to 100% found for the year 1913. The real estate purchases were similarly treated, only there the variation found was greater because of heavy purchases in the Pleasanton Valley in the year 1911, and from the fact that there was no depreciation to be accounted tending to offset these purchases.

10,437

Since this table was made, agreement has been arrived at with reference to the variation in values, which should be assumed for the lands as of dates other than for the year 1913, based upon the valuation found for the year 1913. Those were not used in the computation, because this table was made last July, long before any such stipulation was made. Therefore, in my computations I have made no use of this table, except to use it as a means of determining the cost of the betterment. That is, the land purchases, and the structural costs during this period of years, and as a means of determining by the equal annual payment method the variation in the depreciation allowance to be accounted within this period, the range of the depreciation allowances being shown upon the fourth page of this exhibit, in column 6, rang-

ing from \$204,544 in the year 1907, as there appears, to \$279,220 in the year 1913, using the calendar years.

10,438

10,439

Questioned by Master.

Referring to this last exhibit, the title "Betterments, additions "and abandonments", particularly as to the difference between betterments and additions: The shade of meaning was that added properties might cover those which were newly built; betterments might cover cases, as for example, that of the substitution of a 12-inch pipe for an 8-inch pipe, the additional value of the larger pipe being accounted as a betterment. I don't know that the use of those terms has any great significance in the exhibits.

10,440

("Metcalf's and Sharon's comparison of Judge Farrington's "rating base of 1903, with Metcalf's reproduction cost of 1907 as to "real estate", introduced and marked "Plaintiff's Exhibit 203".)

10,441

Mr. Sharon: It is a mathematical computation, based on Judge Farrington's valuations of 1903, to which has been added the additions since 1903 at cost, excluding overhead and interest-during-construction.

Mr. Metcalf: The point of comparison is to be found in the year 1907. On page 1, for instance, Judge Farrington's valuation, with the modification stated, amounts, on the San Francisco properties, to \$681,000; my reproduction cost estimate, which corresponds to the stipulated values, is \$979,000. On page 2 are shown the details of Judge Farrington's figures relating to the San Francisco properties. On page 3 there is a comparison with respect to the Merced properties, and Judge Farrington's figure brought forward to 1907, being \$3,489,200. My figures, carried backward, according to the stipulated percentages, amount to \$4,867,000.

Questioned by Mr. Greene.

10,442

Judge Farrington's valuation is shown at the left for the year 1903 as \$3,382,600, to which is added the first item, "gum forest, 23 "acres", \$40,980, making for 1904 \$3,423,600. For 1905 are shown the details for properties added, and one subtracted, making the net amount of \$65,600, which, added to the previous amount of \$3,423,600, gives you the amount shown, \$3,489,200. There are no additions to the property, and I have simply taken his capital amount for the preceding years in order to get a comparison for 1907. I have not made any calculation as against the 1906 figures. We have taken his figures as of the year 1903, and added the cost of the lands, without any allowance for appreciation, although, of course, appreciation did occur.

10,443

Mr. Sharon: Parcels 20 and 23 are portions of the additions in 1905 of the Brooks and Osmond Tracts, which are on the west side of the Lake Merced Ranch. They are part of the area draining toward the Pacific Ocean, and it is a fair proposition to subtract those parcels

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in order to compare them with Judge Farrington's valuation brought down to 1907, but the subtraction should be made from the figure, \$3,489,200. I didn't know on what basis to do it, because a part of the addition is within the watershed, and a part is outside the watershed. Those should be added to Mr. Metcalf's to make it comparable to Judge Farrington's. The Parcel 25—which is the parcel to which the water rights attach at the northwesterly corner of Merced, was included in Judge Farrington's 2,730 acres.

Witness: H. H. WADSWORTH for Defendants.

10,445

DIRECT EXAMINATION BY MR. SEARLS.

Wadsworth

I am 51 years of age, reside in Oakland, and am a civil and hydraulic engineer by profession. I am a graduate of the Sheffield Scientific School, Yale University, in the Class of 1886. I was elected a member of the American Society of Civil Engineers in 1901 or 1902. Since 1886 I have been engaged in civil engineering work, 5 years of that time on railroad location and construction, including the construction of lines through difficult country, the construction of terminals, including yards and docks, and some harbor development, including breakwaters for the same; about 5 years on municipal engineering work, having charge of the design of the street improvement, sewers, bridges and their foundations, and some city harbor development, including, also, in connection with the city work, a study for the extensions of water supply systems, which, however, were privately owned. That was mostly in Superior, Wis., and partly in St. Paul, Minn. I made a report on a water supply system for a small town, Glencove, Minn. I am in the Government Service now, and have been for about 20 years. About 9 years of that in the Duluth-Superior District, that is, with offices at Duluth, Minn. I there had charge of dredging operations, the construction of breakwaters, including concrete foundations, and for the past 11 years I have been located here, as the chief assistant engineer for the California Debris Commission, and with the United States District Engineer's Office, who have charge of the Sacramento and San Joaquin River system.

10,446

In my work in California I have had to pass upon and examine projects for hydraulic mining operations, including the sufficiency of storage for tailings, and construction of dams, both as restraining barriers for maining tailings, and for water reservoirs, and for gold dredging operations on the Yuba and Feather Rivers; that is in connection with the Debris Commission work. Also, in that connection, I have the designing and construction of concrete structures erected by the Government, and in the River and Harbor work I have had the dredging of rivers, and the operation of large suction dredging plants, and I have written a report, made the studies and plans for what is known

10,447

as the flood control project for the San Joaquin and Sacramento Rivers, which were subsequently approved by the Board of Engineers of Rivers and Harbors at Washington, and has now been reported to Congress favorably for appropriations; this project is the basis for the State Reclamation Board, under which the Reclamation Board has charge of all the reclamation of all the swamp and overflowed land.

In connection with my work for the Government on the River and Harbor project, I have had charge of both designing and construction. I had personal charge of the construction of the so-called Daguirre Point Cut, a concrete dam on the Yuba River, about 10 miles easterly from Marysville; the construction of a debris barrier on the Yuba River, and the dredging of numerous cut-off channels on the San Joaquin River for improving alignment and dredging for increasing depth.

10,448

In this work I had occasion to become familiar with prices for labor and materials used in hydraulic work in California. I was employed by the Board of Army Engineers, selected by the Secretary of the Interior in 1910 to make an investigation of the available sources of water supply for San Francisco. My employment covered a period of about 2½ years, and the nature of it was the gathering of information as to all conceivable available supplies, either those that were presented to the Board, or any that I could discover that appeared to have any merit; to examine in the field the territory in which the collecting area was, and the examination of possible reservoir sites, the cost of building structures for each of those various schemes, and designing or making of the necessary profiles from the best available sources for determination of the necessary quantities, such as pipe lines, tunnels, dams, and concrete work. At the conclusion of that work I made a report to the Board of Army Engineers, advising them of my opinion as to the relative cost of the different sources of supply available.

10,449

The table which I have before me shows the estimates made by me in 1912 of the cost of construction, exclusive of the distributing system, of systems designed to collect and convey a domestic water supply to San Francisco from the following sources:

1. Hetchy-Hetchy.
2. Eleanor-Cherry-Stanislaus-Mokelumne.
3. American-Consumnes.
4. McCloud River.
5. Sacramento River.

Tables for each source marked "A" correspond exactly with my estimates reported to the Board of U. S. Army Engineers in the appendix to the report of this board to the Secretary of the Interior, dated February 19, 1913.

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Tables for each source marked "B" contained revisions made by me in the estimates marked "A" to meet certain criticisms advanced by the Army Board as to the sufficiency of the original estimates in which I had adopted for comparative purposes certain unit costs used by engineer, J. R. Freeman, in his report on the Hetch-Hetchy project, and to provide for delivery of all the water to reservoirs connected with existing waterworks. The figures as revised are, in my opinion, somewhat in excess of what the probable cost would be, but may be taken as sufficient for the purpose of a preliminary estimate.

First, the Hetch-Hetchy system is that on which the report of Mr. Freeman was based, which has a main reservoir in the Hetch-Hetchy Valley on the Tuolumne River. The conduits connecting it to the city are on the most direct line from that point to and across the San Joaquin Valley, the coast range, or the Mt. Diablo Range, and the San Francisco Bay Valley, to Crystal Springs Reservoir, and with an extension for 50 million gallons a day supply in to the University Mound Reservoir.

10,450

The so-called Eleanor-Cherry-Stanislaus-Mokelumne project includes the collection of water from all four of those streams for a 400 million a day supply, but as we are considering here, an estimate on 160 million gallons a day, only the Eleanor-Cherry watershed, which is tributary to the Tuolumne is included; the conduits from the Eleanor-Cherry reservoirs are in a different line from the Hetch-Hetchy until a point in the foothills of the Sierras is reached, and from there the conduit line is substantially the same as for the Hetch-Hetchy.

The American Consumnes-Stanislaus-Mokelumne project has these four watersheds to produce 400 million gallons, but for this smaller estimated quantity, 250 million gallons a day, only the American and Consumnes watersheds are included; it includes quite a number of reservoirs on the American River watershed, and a few on the Consumnes. The conduit line is different than either of the above, but crossing the San Joaquin Valley and the Mt. Diablo Range, and thence to San Francisco on the same alignment as the other two.

The Mt. Shasta Aqueduct, McCloud River project, takes the water from the McCloud River in the vicinity of Baird, or near the conjunction of the McCloud and Pitt River, and then by a conduit, largely a gravity conduit, very near the hydraulic gradient all the way to San Francisco, with the exception of the crossing of the lower end of Suisun Bay at or near Carquinez Straits, and a pipe line across to San Francisco from Oakland to Hunters Point, or Potrero Point, I am not certain which.

The fifth is a filter supply from the Sacramento River, with intakes at the vicinity of Rio Vista, a pumping plant there, and a

10,451 conduit and filtration works at or near Antioch, and then a pipe line through the Mt. Diablo Range, but very different from that for the Hetch-Hetchy project, to a reservoir in the hills back of Oakland, and thence a conduit through Oakland and Alameda, and across the bay from Alameda Point to Potrero Point.

For the tables marked "A", the estimates were based on the unit costs of the Freeman project for the Hetch-Hetchy, with such variations as difference in location of dams would affect transportation and other cost elements which are not identical.

10,452 I made the revision so as to show the matter contained in "Exhibit B" for the reason that in some particulars the estimates which I have previously made, based on the Freeman estimates, and which were necessary in that case to give a proper comparison between the different estimates of cost, certain items of unit costs were, in my opinion, too low, and those were increased to such a figure as, in my opinion, was sufficient for the purpose, and that increase is shown for each of these sources in the tables marked "B" under the respective headings. Then finally I have divided the total cost thus obtained by the number of million gallons for which the estimate was made.

10,454 Questioned by Master.

This is my estimate in the final analysis. When I take sheet 1, and take the figures under the "B" class, as against the figures under the "A" class, that is my judgment, and not merely Mr. Freeman's judgment. I have taken his figures and modified them according to my own ideas.

10,455 (Counsel for Plaintiff asked the privilege of reserving the right to make any motion that he may feel advised after going into Mr. Wadsworth's figures.

(Preliminary estimates of constructing systems for the delivery of water from certain sources, by H. H. Wadsworth, introduced and marked "Defendants' Exhibit 204".)

CROSS EXAMINATION BY MR. GREENE.

10,456 The figures under "A" were made in 1912; those under "B" within the past two weeks. The estimate for the Sacramento supply was my own estimate, and the capacities in each case were derived by me, personally. The labor and material allowances were made as of 1912. I do not know what allowance I made for the cost of cement in 1912.

In 1912 I made estimates and notes that certain of those estimates, as given in the report, should be increased some considerable percentage to raise them, to what in my opinion, was a fair cost, but I cannot reproduce those figures from memory, they having been made nearly four years ago. I am not certain whether I figured on an 8-hour or a 10-hour day of labor in 1912. The 15% increase in

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cost of the pipe was to allow for a \$2 a day rate for common labor, in place of a \$2.25 rate which I think I used originally. I increased the first estimate by a percentage, which, from the figures I made, would be equivalent to a \$3 a day rate; this estimate, which appears under "B", was not made up de novo, considering the cost of cement, and labor, and pipe, independently from the previous estimate. 10,457

Taking the Hetch-Hetchy: I added \$52 per lineal foot for all the tunnels in the Mt. Diablo Range, which, of itself, amounted to over \$8,000,000, and in addition to that I added 15% increase to the cost of the pipe line, and I added an additional pipe line complete from Crystal Springs Reservoir to San Francisco, because that was not included in the first estimate, and I also added an aqueduct from Irvington to Lake Chabot to give the water a delivery at a reservoir where it could be available for distribution rather than leaving it hanging in the air. Mr. Freeman's tunnel costs averaged \$68; it is nearly double the tunnel costs of the Mt. Diablo Range. That would be a total of \$120, and was for the tunnel with its lining, where there was lining. That tunnel was 12 ft. 10 inches in diameter, and I think that was the net clear diameter, but I am not positive as to that. 10,458

To add that \$52 on I simply multiplied the length of the tunnel by \$52. The examination by myself and other engineers indicated that the cost of tunnels in the Mt. Diablo Range would considerably exceed Mr. Freeman's unit costs; it is a very broken formation, and in places carries a larger quantity of water, and the \$120 was taken, as that was the estimate which Messrs. Mulholland and Lippincott, on the request of the Spring Valley Water Co., reported would be the cost of these tunnels; it seemed to me then, and it has since, that it was somewhat excessive, but as Mr. Searls suggested that I make it a figure that I felt sure would be sufficiently large, I adopted the largest estimate for those tunnels that I was cognizant of.

The figures as revised are, in my opinion, somewhat in excess of what the probable cost would be that might be taken as sufficient for the purpose of a preliminary estimate. In my opinion, \$100 a foot would be the estimate of cost for such tunnels. I have not personally driven a tunnel, but I have had occasion to examine into the cost of tunneling and rock excavation in various ways, but I do not pretend to be a tunnel expert. I have had occasion to observe tunnel costs, and read of tunnel costs, and in my examination of mining projects in the Sierras I have had occasion to check up what tunnels have cost, all of which leads me to feel that Mr. Lippincott's and Mr. Mulholland's figure of \$120, is too high. 10,459

To give an approximation as to what it would cost to bring 50 millions a day into San Francisco would be another estimate; of course, using the conduits that I have worked out in this connection, I could divide those total costs by 50 million gallons, and get the cost

10,460 per million gallons a day on that basis, but if you are going to bring in simply 50 million gallons a day, without any idea of future expansion, it would be another estimate from the bottom up. I have made no such estimate. I have no idea as to what the increase or decrease over the result as reached by dividing my figure of \$58,010,000 by 160, and multiplying it by 50 would be to bring in 50 million gallons. The cost per million gallons would be a good deal more per million gallons than the cost I have arrived at here in this manner of costs.

10,461 Referring to the Sacramento River estimate; I used Mr. Hazen's costs for intake pump and filtration plant. I used larger pipes and tunnels, so as to plan for an ultimate delivery of 400 million gallons a day in that case, and for the pipes across San Francisco Bay I used larger pipes than Mr. Hazen did, and thereby diminished the cost of pumping in San Francisco to replace the head which was lost by friction in the pipe across the bay. I used the same cost for the pipe that I did in the other four estimates. Those costs were Mr. Freeman's costs, increased by 15%, because his costs were somewhat too low, and his costs of labor were somewhat too low, and my estimate was that 15% additional would bring it up to what, in my opinion, was a fair and proper cost. For my work from Sacramento 10,462 to Oakland I reduced it to a basis of so much per foot for each size and weight of pipe that entered into the conduit. I am reading now under 5, filtered supply from Sacramento River, under "A", tenth line: Steel pipe, cement lined and coated, 7.75 feet diameter; shell from $\frac{1}{4}$ inch to $\frac{9}{16}$ inch, price per foot varying from \$17.23 to \$29.70. That price was increased by 15%. The average of that 143,000 linear feet would be gotten at by dividing the figures 2,884,000 by 143,000, and it would be something over \$20 an average price for that.

10,463 The cost of \$17.23 per foot is for the lightest weight pipe, and the elements that go to make it up are the cost of the steel, the cost of fabricating, the cost of lining, the cost of transportation, and the cost of laying. I don't know at this time what base costs for steel I assumed. I knew very clearly at the time the base price of steel plate, but I have not had any occasion for the last few years to look into structural steel costs. If I were approached today with regard to the laying of a steel pipe, and had no notion of its cost, I would study it up; if I had a record such as this, and conditions had not changed from the time that I made the estimate, I would say they averaged from \$17 to \$30, depending on the weight of the pipe. If someone came to me today to put in a 36-inch pipe, and asked approximately what it would cost per pound for the metal alone under present prices, I would say offhand probably something less than 2 cents, or perhaps 2 cents. I think we figured on something less than that in 1912, but that is merely a guess, because I have not refreshed

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my memory as to these points. That amount of something less than 2 cents was for the flat plate, not made up. I have never bought any pipe out here myself, but I have had occasion to buy other structural steel. 10,464

I have built concrete dams on the Yuba River, one about 10 miles above Marysville, and another one about 16 miles above Marysville, and I have had other dams built under my direction at various points up in the Sierras. We paid from about \$1 to \$2 a barrel, or \$2.25 a barrel, for cement. On that first Yuba River job, which was contract work, my impression is that was about \$1.25 a barrel. That was built in 1906, and the cement, I think was standard Portland cement. That was Government work. I am not stating that that is the actual cost of the cement; the cost of the concrete in place was the only thing that particularly interested me, and that was about something like \$5 or \$5.25 a cu. yd., as I remember it now. The \$5 price did not include the cement, but there was nothing else that it did not include. The Government furnished the cement to the contractor, and he did the work. He got the gravel and sand out of the river bed in the immediate vicinity of the work. 10,465

I have not in any instance purchased the cement myself. When I was figuring on these various lines I used the costs of Mr. Freeman's estimate for all of these, for cement. Mr. Freeman's costs in his report are so divided that it is a little hard to get at it; what I did was to take, not only his unit costs for the actual work, but I took his final costs, with his overhead charges all included, and segregated them back, distributing the overhead charges among the various items to get at the unit cost of the various items entering into the construction. I did pay attention to such items as the cost of cement in making that check. I did not say that I could not find out from Mr. Freeman's report what amount he estimated. I said that his estimates of cost, as published in his report, were built up in such installments that you could not at a glance tell what his unit costs for the completed structures were, and that was the only thing that interested me. I checked up the costs of steel and of cement, and of transportation, to see whether in my opinion the work could be executed at the cost that he estimated. 10,466

After I made an examination of Mr. Freeman's report, I was able to determine what units he had applied for such articles as steel and cement, but now I don't recall what those units were. The date of this estimate today is not an estimate of today. It is an estimate made today for conditions and prices as of 1912. I don't know what prices I applied today as of 1912 for cement and steel. I have not had any occasion to refresh my memory on that. I made this estimate within the past two weeks, but, as I have indicated, the basis on which I made it did not go back to consider each and every element entering into it. 10,467

10,468

I used 15% because at the time of my comparison of his costs my opinion was that he was somewhat too low, and the addition of 15% would bring it up to a satisfactory and proper estimate. I made a calculation at the time to determine that. There was practically no new work done by me within the last two weeks, except the assembling of the figures, and the addition of some structures, based on the same unit costs as the other.

10,470

Witness: LEONARD METCALF for Plaintiff.

Metcalf

DIRECT EXAMINATION BY MR. GREENE.

Referring to page 4 of Plaintiff's Exhibit 203, comparison is made in a similar manner between my reproduction cost estimate of Peninsula watershed and reservoir lands, as of the year 1907, and Judge Farrington's 1903 figures brought down to the year 1907, by simply adding the additional land purchases; my figure being \$4,784,000; Judge Farrington's increased by the purchases \$3,639,000, without any allowance for appreciation in the value of those lands between the date of his valuation in 1903 and the year 1907. Upon page 5 appears a similar comparison of the Alameda system lands, as of the year 1907, my figure being \$2,019,000, Judge Farrington's \$2,420,000, including in Judge Farrington's figure the additional lands purchased between 1903 and 1907. That was due to his adopting \$100 per acre flat valuation for watershed valuation, and not due to any reduction in real estate value.

The Master: Q. Do you mean that Judge Farrington did not value the Calaveras lands, or the Arroyo Valle lands?

Mr. Greene: He did value them.

10,471

Mr. Searls: He valued the lands, but he excluded the reservoir values.

Mr. Greene: He allowed values for all of the lands in Alameda that the company owned; there were not any that were excluded, but he did not allow reservoir value for the lands in Arroyo Valle and San Antonio, or Calaveras.

The Master: Then there is an error here, is there not Mr. Sharon?

Mr. Sharon: No. Judge Farrington's valuation for the watershed lands in Alameda, exclusive of about 4,400 acres in the Arroyo Valle, was valued at \$100 per acre, and a deduction was made from that \$100 per acre of watershed lands for the capitalized rental value of the watershed in the Calaveras watershed, at about \$90,240, and Judge Farrington did not value, as property in use as of 1903, the 4,421 acres of land in the Arroyo Valle watershed. He had that classed in his list of properties not in use, which aggregated, I be-

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lieve, about \$5,000,000; 4,421 acres of Arroyo Valle land, as he stated, cost \$54,287. The addition was made here to these Arroyo Valle lands to make the comparison complete with Mr. Metcalf's reproduction cost estimate, as he had included the Arroyo Valle lands. The only thing I have added to his properties in use was the Arroyo Valle watershed land, and that did not include the reservoir value on Calaveras.

Mr. Metcalf: Mr. Dillman has just called to my attention, on page 5, Alameda system analysis, that we have added for the 4,421 acres of Arroyo Valle lands \$64,287, which was the cost reported by Judge Farrington, whereas, Judge Farrington used on the other watershed lands \$100 per acre; if the sum of \$100 were allowed for these watershed lands, of course the sum of \$64,287 would become \$442,100. We have used here, for the purpose of comparison, the cost given by Judge Farrington. I just make that statement to make the record clear. On page 6 similar comparison is submitted on the rights of way, in which Mr. Sharon has treated my figure for the years other than 1913 with reference to the 1913 values upon the basis stipulated for the real estate valuations, and we find the comparison for the year 1907 \$460,000 for my reproduction cost, and \$425,000 for Judge Farrington's valuation, plus the additional purchases in the interval since 1903 to 1907.

10,472

I come now to a discussion of the financial situation, as I call it, being an estimate of the probable average return in the future period of 8 years, 1915 to 1922, compared with the actual average rate of return in the past period of 8 years, 1907 to 1914, based upon 1902 ordinance schedule of water rates, plus 15%. I have made the comparison on the basis of an 8-year forecast, simply to make it the same as the period covered by these proceedings.

First I take up the question of new construction, making use of the studies which Mr. Hazen made with reference to the cost involved in the construction of the proposed Calaveras conduit, and I may say that I have been over that line and its works a number of times with Mr. Hazen and with Mr. Elliott. The estimates, with respect to the metering and pipe extensions, and similar construction, are my own, and were made quite independent of Mr. Hazen, and I believe, in advance of his figures.

10,473

Hazen's analysis of the development of the Calaveras supply, involving the completion of the dam and the building at present of one 48" steel pipe line having a capacity of approximately 30 M.G.D. with an addition at a later date of a second 48" steel pipe line with tunnel under the Mission Ridge and pipe following along the southerly end of the Bay to a conduit on the ridge southerly and easterly from the Crystal Springs and San Andres supply discharging into the San Andres basin, with the building of a supplementary 54" steel pipe line from San Andres reservoir to Honda

reservoir, and a 36" steel pipe line from Ocean View to College Hill with a booster pumping station at Millbrae and some miscellaneous connections, seems desirable and reasonable as a basis of future construction and estimate.

In addition to this construction there will be required the installation of a certain number of meters to conserve the water supply, particularly during the years 1916, 1917 and 1918, until the new Calaveras supply has been made available in the city. There will also be required annually additions to the pipe distribution system which may range from 15 to 20 miles per year, involving a total of approximately 150 miles of additional distribution system during the period from 1913 to 1922. An additional high service reservoir will also probably be built, the capacity of which has not yet been determined, but which may fairly be assumed to be of 30 M.G. more or less.

10,474 In view of the fact that more or less of this construction will be undertaken piecemeal, the interest-during-construction will be substantially reduced. On the other hand, the unit cost may be somewhat increased thereby. There will probably also be involved a substantial amount of development expense and additional lands and some water rights may perhaps have to be purchased. With reference to the lands, it is assumed, however, that approximately \$4,000,000 of the value of the Merced lands will be deducted from the rating base in the years 1918 and 1919, on the assumption that the major portion of these lands will be marketed, and the Lake Merced will be given up as a source of supply and held merely as an emergency supply for protection against conflagration and accident resulting from earthquake.

The total amount of additional capital thus involved, which it is assumed should be accounted in the rating base, will be as follows: Then follows a tabulation on page 2, which it is perhaps not necessary to read in detail. The Calaveras-Honda land cost is based on the figures of Mr. Hazen; the other items, 5 to 9, inclusive, are my own; they aggregate a total construction account between 1915 and 1922 of approximately \$13,000,000, from which I have deducted the annual depreciation allowance of approximately 8% gross revenue, amounting to \$2,612,000, leaving net additions to structures \$10,410,000. I have assumed that that depreciation allowance would be deducted from the capital sum each year, and that there would then be added on to the capital sum the amount of the renewals.

Questioned by Master.

10,475 It is treating the subject after the manner of the equal annual payment method of accounting depreciation; under that method all renewals become new construction, and the depreciation allowance is deducted each year from the capital sum. I mean in this period

of 8 years, 1915 to 1922, my total depreciation allowance will be \$2,612,000, on account of the entire property, but the renewal of old works I apprehend will be comparatively small during that period. I wanted to make that very conservative, and I have, therefore, taken but \$271,000. In other words, the depreciation account of the whole works will pay for a part of this new extension, because that is its purpose. As I view the situation, it is wise to invest any portion of the depreciation fund which is not needed for renewals in the property again, so that you shall not have a fund lying idle, but go back in the property. I think I have probably under-estimated the renewals of the old works, but I wanted to be very conservative on that in order not to swell the construction account.

As to the lands, I have assumed additional purchases of about \$100,000 a year, amounting to \$1,022,000, with an addition of \$4,000,000 for the Merced lands when they are released, leaving a net deduction as a result of the treatment of the Merced lands of \$2,978,000, nearly \$3,000,000; the water rights I have increased on the basis of the estimated additional mean annual consumption, that is as stated in million gallons daily, on the basis of an allowance of \$100,000 per million gallons daily. I do not mean that they will have to purchase water rights at that rate, but some portion of that will have to be paid to acquire the future rights in Pleasanton, Livermore Valley, for instance, and the remainder of it is covered by the fact that some of the rights already acquired would come into use, and so will be included in the rating base, and thus merely affect the rating base.

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Questioned by Mr. Searls.

In the main, this is to determine how much new capital the company would need; as to these items, it represents solely the new rating basis upon which returns must be earned. So far as the City is concerned, it makes no difference whether these rights are purchased, or whether they are now regarded as out of use, and yet will come into use later on. I mean to say, on my theory, that the rights have value in themselves. That makes the net deduction on account of the lands and water rights of \$1,078,000, leaving net additions on account of structures, lands and water rights, of \$9,332,000. This sum I have increased during this period by an allowance for going value of \$1,100,000, and an additional allowance for working capital for the reasons I have already stated of \$100,000, which makes the total additions to the property which will be included in the rating base in the future 8-year period, of \$10,532,000; in other words, about \$10,500,000.

On pages 3, 4, 5 and 6 I have inserted for the sake of completeness, Mr. Hazen's estimate of the Calaveras-Honda Aqueduct, which he included in one of his estimates, and which I have made use of in this analysis.

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Referring now to the table shown upon page 10, "Additional "capital requirements", excluding interest-during-construction allowance, I will refer to certain of the columns there to make clear what I have done. In passing I will say that I have excluded interest-during-construction allowance upon the assumption that the expenditures, as made, will be included in the rating base, and that no additional allowance would therefore have to be made. If the matter is treated by carrying the construction account until the completion of the work, without allowance in the rating base, it would be necessary to include an item of interest-during-construction covering the carrying charges that would be involved.

Column 7 covers the miscellaneous improvements to supply works, chiefly cost of additional reservoir. I doubt if this item would cover the cost of a new 30 million gallon distributing reservoir. When that is built certain of the pumping stations will probably be shut down, except for emergency use, to-wit, the Ocean View, the Precita, the Black Point, and perhaps the Clarendon pumping station, depending upon the final plans that may be adopted for reinforcing the supply conduit system.

In column 8 are shown the meters and minor improvements covering the introduction of meters upon two-thirds to three-fourths of the existing services not now metered.

Column 9 the new services, including meters, covers the construction by the company of services to supply new consumers, in accordance with the recent order of the California Railroad Commission, including the cost of furnishing and placing the meters on the majority of those services.

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Column 10: Covers the extension and reinforcement of the city pipe distributing system, in accordance with the estimated growth in mileage thereof shown in the unit statistics forecast attached hereto, based upon the past experience of the Company and the estimated growth in population.

Columns 17: "Lands", covers the cost of the additional lands, rights-of-way and easements, aggregating a total sum of \$1,022,000, which it is estimated the Company may have to acquire in the future 8 year period, with a deduction of \$2,000,000 upon each of the years, 1918 and 1919. This deduction (\$4,000,000) is made upon the assumption that with the completion and introduction of the new Calaveras supply through a conduit from Calaveras to Honda the Merced Lake supply may be given up with the approval of the city authorities as a regular source of supply, thus releasing for sale all of the Merced Ranch lands, except approximately 823 acres desired by the city for park purposes and to protect the Merced Lake for use as an emergency supply in case of interruption of service, due to earthquake or other cause, similar to that which occurred in the year 1906.

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The major portion of the land costs I assume will result from the introduction of the new Calaveras supply, with the necessary lands and rights of way, and such costs as may be incurred in the development of the underground sources in the Pleasanton Valley, with some purchase of riparian lands along certain of the streams such as the Calaveras, and perhaps later on, on the San Antonio or Arroyo Valle.

Column 18: "Water Rights", covers the water rights which will have to be put into service in accordance with the estimated increase in consumption based upon an assumed value of \$100,000 per million gallons average daily increase in draft in excess of 40,000,000 gallons per day, the average draft for the years 1914-1915.

Column 19: Covers an allowance for the increase in going value of the property corresponding to the estimated increase in gross annual revenue, and amounting to \$1,100,000 during the period 1915-1922. This amount has also been determined by the independent computation of the development expense measured by the difference in the estimated net annual revenue and a 7 per cent. rate of return upon the additional capital requirements of the future 8 year period, 1915 to 1922, with compound interest upon the deficits, less the excesses.

Upon the latter basis of determining development expense it will be noted that development expense incident to the new capital investment reaches a maximum of \$242,000 in the year 1919, and is amortized by the earnings in excess of the 7% assumed rate in the following period of years to 1922.

This computation indicates that upon the assumed premises the estimated increase in gross annual revenue will carry the additional capital investment upon a 7% annual return. This computation indicates further, however, that within the future 8 year period under the conditions assumed no margin of divisible profit will be realized which would increase the present rate of return upon the present investment.

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The difference between the two methods of computation grows out of the fact that the first approximate assumption of an increase in going value, corresponding to the annual increase in net revenue, takes into account the growing security and appreciating value of a property with increasing divisible net revenue and the further fact that under the existing conditions and assumed hypothesis the actual return upon the fair value of the property is less than the reasonable rate of return; whereas, the second method of computation has to do solely with the modifying effect of the additional investment of capital in this property, independent of the property as it exists today.

Column 20: "Working Capital", covers the estimated necessary increase in working capital, amounting to \$100,000 (the allowance during the past 8 years having been estimated at \$100,000 excluding

the investment in stock on hand, etc., which is covered by the inventory,) incident to the active construction work anticipated in the future 8 year period.

Based upon the foregoing assumptions, it will be noted that the rating basing is estimated to increase from approximately \$43,700,000 in the year ending December 31, 1914 (applicable by stipulation to the fiscal year 1914-15) to \$54,232,000 in the year 1922, while the per capita amount of the rating base remains approximately the same throughout this period, varying from \$91.50 to \$88.78 per capita,—the amount of the depreciation allowance being deducted annually from the rating base, which is increased annually by the additional capital requirements of the previous year.

On pages 12 to 18 following, covering "Water Works General Statistics, San Francisco", are shown data relating to the physical and financial statistics of the Spring Valley Water Company from the year 1861 to 1915, with a forecast from the latter date to 1922.

It is to be noted, however, that the financial figures contained therein, which were worked up some months ago, have not been modified in accord with the recent evidence submitted in the rates suit hearings by Mr. F. P. Muhlner. While these corrections are comparatively small in amount, they account for the difference in financial data which appear in these tables as compared with the following table shown on page 19, "Metcalf's Analysis of Past Return, for the 8 year Period Ending June 30, 1915, and Probable Return for the Future 8 year Period, ending June 30, 1923, Upon Fair Rating Base for the Spring Valley Water Company Property Under the 1902-Ordinance-Schedule-of-Rates-Plus-15% Under Adjudication in the Rates Suits of 1907-1915," and the table on page 20, giving the average increase for the past and future 8 year period, based upon the increase for the individual years shown in the table on page 19. I have included these statistics, thinking they may be of interest as showing historically the change in the financial conditions, and the physical conditions under which these works have operated. I think they are clear in themselves, and do not require comment.

Reverting now to the blue-print which follows those statistics, and particularly to the financial situation table, shown on page 20, you will find a comparison between the past 8-year period and the future 8-year period, the discussion of which is referred to on page 23-a to 26.

SUMMARY OF RESULTS SHOWN IN DETAIL IN TABLES UPON PAGES 19 AND 20.

The question under discussion is as to whether the Ordinance-of-1902-Rates-Plus-15%-Excess, the actual rates collected (the 15% excess being impounded under order of the Court) yielded in the years,

SPRING VALLEY WATER CO. VS. CITY AND COUNTY OF SAN FRANCISCO

July 1st, 1907, to June 30, 1915, a reasonable return upon the fair value of the property of the Spring Valley Water Company devoted to the service of the public.

Basis of Valuation: It is assumed that the company is entitled to earn a fair return upon the fair value of the property of the company, or, stated in another way, the reasonable operating expenses, including taxes, the necessary depreciation allowance to maintain the property unimpaired, and a fair return, including interest and profit, upon a fair rating base,—the rating base being assumed to be the fair value of the property of the company reasonably necessary to the service of the public.

As applied to so large a property as this the determination of what property is reasonably necessary to the service of the public is not so simple as would at first appear, but the decision upon this matter will largely govern the actions of the corporation in making provision for the future needs of the public.

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Three general theories upon this subject have been advanced:

First: That the company should be allowed reasonable latitude in determining how far it should go in acquiring sources of water supply to meet the future needs of the community, and that the company after the purchase of such properties should be allowed a fair rate of return upon the fair value of these properties,—even though not yet actually in use in the active service of the public.

Second: That the company should be allowed reasonable latitude in determining how far it should go in acquiring sources of supply to meet the future needs of the community, and that the company after the purchase of such properties should be allowed full carrying charges (i. e., interest but not profit) upon such properties until actually put into use, and thereafter a fair return (i. e., interest plus profit) upon their fair value.

Third: That there should be included in the rating base only the property strictly essential to the present operation of the works, and actually in use in the service of the public, or in other words, that property held in reserve or purchased to meet the future needs of the public should not be included in the rating base until and to the extent only that it is put into actual active use in the service of the public.

The application of the first and second theories may lead to very similar results if consideration be given in determining the fair rate of return to the relative amount of property which has to be held for future service as compared with that required only for present needs.

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The third theory is believed to be unsound legally and is open to the practical objection that it substantially increases the risk or hazard under which the company is forced to operate and is likely to lead or force the company to postpone the date of acquisition of prop-

erties needed for the future service of the city until they may have been developed for other purposes or have acquired through other cause virtual monopoly prices, thus ultimately greatly increasing the cost of the service to the public. It is further open to the objection that, under it, rates would have to differ widely before and after new construction involving heavy expenditures.

Average Conditions Must Prevail: Experience in the operation of water works and other public utilities has shown that economy is best subserved when the plant is built to meet the reasonable future needs rather than merely those of the present. Thus it is generally found advantageous to look forward in the designing of the supply system for a period of from 40 to 50 years, of the distribution pipe system from 15 to 25 years, and of the distributing reservoir system from 20 to 30 years perhaps. This means that in the life history of such plants there are periods when the plant is successively overbuilt, normally developed and underbuilt, and that from time to time major construction involving very heavy expenditures must be undertaken to meet the growing demands of the future.

10,485 These conditions are reflected or felt in the divisible revenue derived from the property, and it is practically impossible to keep the rates in theoretical balance with the investment or fair value of the property continuously throughout the life history of the property. It is found more advantageous in the operation of publicly, as well as privately owned works, to so establish rates as to make the return during periods of years fair to the consumer as well as to the corporation, and such that the variation in rates charged shall be as small as possible, on account of the practical difficulties always incident to the enforcement of changes in the schedule of rates.

Present Condition of Spring Valley Water Company Property: It is contended that the Spring Valley Water Company has used good judgment in acquiring the sources of supply which will be needed to meet the future water demands of the community, and that the sources now owned by it are reasonably and prudently in advance of the needs of the community; that the storage reservoir system is normally developed at the present time; that the conduit system necessary to bring the water from the sources of supply to the city distributing reservoirs is today substantially underbuilt, that is, that it lacks reserve capacity; that the city reservoir system is in a normal stage of development; and that the distribution system might advantageously be reinforced to provide greater reserve capacity, and be extended to meet the growing needs of the community.

10,486 The present lack of reserve capacity in the conduit and in certain localities of the distribution pipe system is the direct result of the unfortunate issue over rates which has existed between the city and the company during the past decade.

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COMPARISON OF PROBABLE AVERAGE RETURN IN FUTURE PERIOD OF 8 YEARS (1914 TO 1922) WITH ACTUAL AVERAGE RATE OF RETURN IN PAST PERIOD OF 8 YEARS (1907 TO 1914).

Based upon 1902-ordinance-schedule-of-water-rates-plus-15% impounded under the jurisdiction of the court.

Rates Collected: In the year 1907 and up to November 1, 1908, the company collected rates under the 1902-ordinance-schedule. Since then it has collected 15% in excess of these rates. The city has sought to enforce the lower rate schedule passed by the Board of Supervisors.

Population: In the year 1906 the population of San Francisco amounted to approximately 395,000, which fell to about 330,000 in the year 1907 following the earthquake and fire of April 18, 1906. From the year 1906 to the year 1914, when the population is estimated to have been 477,000, the average annual rate of increase amounted to 2.4%, the annual increase in the period from 1914 to 1922 being estimated at 3%, giving 606,000 population in the year 1922. The increase of the future over the past eight year period is estimated at 34.%, or 3.7% per annum. Furthermore, the increase in the population upon the peninsula south of the City of San Francisco which may have to be provided with water from Spring Valley Water Company's sources may increase the figures cited.

(Financial situation, Leonard Metcalf, introduced and marked "Plaintiff's Exhibit 205".)

ONE HUNDRED AND FORTY-THIRD HEARING.

APRIL 24, 1916.

Witnesses: LEONARD METCALF for Plaintiff.
M. M. O'SHAUGHNESSY for Defendants.
J. M. BAILHACHE for Defendants.

Witness: LEONARD METCALF for Plaintiff.

Miles of Pipe: In consequence of the small amount of distribution pipe laid during the past decade, as a result of the issue between the city and the company upon the rates, it is estimated that 20 miles more or less of pipe will have to be laid annually during the next 8 years, involving an increase in the pipe mileage of approximately 160 miles or 19%, which is equivalent to an average annual increase of 2.2% per annum. 10,488

The Taps are estimated to increase in the coming 8 year period (1914 to 1922) by 29%, or approximately 3.3% per annum.

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The Water Consumption is estimated to increase from 39.4 million gallons daily in the year 1914 to approximately 59 m.g.d. in the year 1922, involving an increase in the coming over the past, 8-year-period of 36%, or 3.9% annually.

The New Construction less depreciation allowances, anticipated for the years 1914 to 1922 is shown in detail in the foregoing page (2), estimated at approximately \$10,410,000 in structures, in lands \$1,022,000 less an allowance of \$4,000,000 upon Lake Merced lands,—which it is assumed may be released for sale after the development of the new Calaveras supply,—in water rights \$1,900,000, in going value \$1,100,000, and in working capital \$100,000, giving total net additional capital investment \$10,532,000.

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The Rating Base is discussed in the foregoing page 19, based upon an assumed fair value of the property of the Spring Valley Water Company devoted to the service of the public, of \$43,600,000 as of December 31, 1913, increased annually by the assumed investment cost of additional lands, structures and rights which will be required during this period of years.

From this analysis it appears that the rating base may reasonably be expected to increase from \$43,600,000 in the year 1913 to \$54,232,000 in the year 1922, the per capita amount thereof decreasing from \$96.30 in the year 1913 to \$89.50 in the year 1922; and that the average amount of the rating base during the future period of eight years (\$49,682,000) will be 23.0% greater than that for the average past period, 1907 to 1914 (\$40,375,000) or that it will be increased at the rate of approximately 2.6% per annum.

The Gross Annual Revenue fell from \$2,299,765 in the year 1905 to \$1,535,783 in the year 1906 in consequence of the earthquake and fire; increased under the 1902-ordinance-schedule-of-rates-plus-15% to \$3,483,000 in the year 1914; and is estimated to reach the sum of \$4,550,000 in the year 1922 as based upon the assumed growth in population.

Attention has already been called to the interdependence of growth in population, revenue, operating expenses, net revenue and fair value of the property as a rating base.

Under these assumptions the increase in the average gross annual revenue during the coming 8 years over the past period of 8 years is estimated at 38.2% or 4.1% per annum.

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The Operating Expenses, including taxes, which amounted in the year 1914 to \$1,235,580 are estimated to increase to the sum of \$1,520,000 in the year 1922, and to be on the average 33.9% higher during the coming than during the past eight years, following closely the assumed percentage increase in population served. Under these circumstances the annual rate of increase will be approximately 3.7%, or slightly less than the rate of increase of the gross revenue (4.1%).

The Necessary Depreciation Allowance is estimated to increase by 33%, or 3.6% per annum in the average of the future over the past eight-year-period.

The Combined Operating Expenses, Taxes and Depreciation Allowance are thus assumed to increase by approximately 33.8% or 3.7% per annum on the average in the coming, over the past, eight-year-period.

The Net Annual Revenue resulting from these premises is assumed to increase from \$1,953,000 in the year 1914 to \$2,666,000 in the year 1922, or 41.9% on the average during the coming over the past eight-year-period. This is equivalent to 4.5% per annum,—slightly in excess of the estimated annual increase in gross revenue (4.1%).

Resulting Annual Return upon assumed Fair Rating-Base. Under the several conditions assumed, the net annual return upon the estimated fair rating-base or fair value of the property of the company in the service of the public, has increased from 2.5% in the year 1907 to 4.5% in the year 1914, and is estimated to increase to 4.9% in the year 1922 under the continuous application of the 1902-ordinance-schedule-of-rates-plus-15%. Comparing the average conditions anticipated for the future eight-year-period, from 1914 to 1922, with the past eight-year-period, from 1907 to 1914, the average-rate-of-return upon the fair rating-base is estimated to increase from 4.0% to 4.6%, the amount of the rating-base-per-capita decreasing during this interval of time from about \$97.60 to \$89.90.

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CONCLUSION.

The enjoined ordinance-rate-schedules could not yield a fair return to the Spring Valley Water Company upon its property devoted to the service of the public.

Even the continued application of the 1902-ordinance-schedule-of-rates-plus-15% collected by the company since November 1, 1908, will not yield adequate compensation to it upon the fair value of its property devoted to the service of the public, though it is believed that the rate of return will increase from 4.0%, the average return during the past eight years from 1907 to 1914, to 4.6% during the future eight-year period, from 1914 to 1922. The increase in net annual revenue under the 1902-ordinance-schedule-of-rates-plus-15% is estimated, however, to be just sufficient to care for the additional capital investment during this future 8-year-period and is disregarding the existing plant.

Should the anticipated growth in population of the city of San Francisco and vicinity fail to be realized the indicated rate of return would also be reduced. In this connection there should be borne in mind the interdependence of the growth in population, gross revenue,

10,493 operating expenses, net revenue and additional investment in plant or in new construction.

It is also to be borne in mind that the financial experience of this company during the next decade,—should the property not be taken over by the city,—will have an important influence upon the possible basis for the refinancing of its obligations when the outstanding bonds fall due, upon December 1, 1923, and whenever substantial additional resources are required for the extension or betterment of the service to meet the demands of the growing district.

10,494 I have prepared in Table 7-A a recomputation differing from the first computation in this fact; that instead of forecasting the financial history anticipated for the works for the period 1914 to 1922, I have assumed the actual financial history of the plant during the years 1906 to 1915. In other words, I have predicated the going concern value computation in Table 7-A upon the period preceding the date of valuation, instead of that following it, with the result of finding a difference of approximately \$680,000 on the 7% fair annual return basis, the amount being on this computation \$4,108,000, instead of \$4,786,000. That is on the 7% basis, and upon the 6% basis a difference of approximately \$600,000, the amount being \$2,486,000 instead of \$3,098,000, as previously obtained; both of these computations referring to a basis of valuation of \$43,500,000; in Table 8-A I have made similar computations based upon the \$35,000,000 assumed valuation, which, as I view it, is at the earlier date. Perhaps I should not say that; the 10,495 \$35,000,000 valuation I have assumed in my first computation to apply as of December 31, 1913; in making this computation for the going concern value on the basis of the past financial history, it seems that it is tantamount to assuming that that \$35,000,000 valuation applies as of the beginning of the period which would be in the year 1906 instead of 1913. It would work out on either basis.

If his Honor holds that in principle I am wrong in using the future period of years instead of the past, of course, the \$35,000,000 would apply to the year 1913; as I view it on principle, however, that amount applies to the beginning of the period of computation, and not the end of the period of computation; the results of this computation are approximately the same as the other. That is, the difference resulting are somewhat greater. For the 7% fair rate of return I find a going concern value of \$3,466,000 instead of \$4,317,000, as figured in Table 8, and upon the 6% basis, \$2,156,000, instead of \$2,837,000 as figured in Table 8 previously, the difference being about \$800,000.

10,496 (These computations were inserted in "Exhibit 198" as Table 7-A and 8-A.)

Mr. Metcalf: In Table 9-A I have made the computation with respect to the development expense, based upon original cost of lands and structures, eliminating from the structures the abandoned struc-

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tures upon the dates upon which they were abandoned, and have figured the development expense without any allowance for depreciation in land values, with the result that I find a cumulative surplus as of the year ending December 31, 1913, of \$3,730,779, which is interpreted as meaning that upon my assumed fair cost of money to this corporation, applied to the capital sum annually for comparison with the difference between the actual receipts and the operating expenses, taxes and depreciation allowance from year to year, I find that the company has earned without consideration of the appreciation in value something in excess of my assumed fair estimated cost of money to the corporation.

Questioned by Mr. Searls.

If I added accumulative appreciation in land value, \$4,628,000, to the capital sum as I determine it here, I would not have a rating base of about \$27,000,000, because, under these circumstances you would have to add not only the appreciation in value, but also the development expense, which would increase the sum by about \$8,000,000 more; in other words, that appreciation should be added as it accrues year by year, or period by period as it develops; my assumption being that as the property appreciates in value the rate should be predicated upon the appreciated value of the property.

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In this table I get a capital sum of \$22,518,990, and if I add the appreciation in land value to this sum, I would not have, on the theory on which this table is based, approximately \$27,000,000 as my rating base, because on the theory on which this table is based, at the end of the period of time, you would not add simply the appreciation in land value, but you would add the appreciation in land value from time to time as it occurs, which would mean that after the appreciation, whenever it does occur, you would be entitled to earn a fair rate of return upon it; failing in this, the deficit in fair returns would be carried into the capital sum, which would mean that as result of these land operations you would have had a deficit instead of a surplus in development expense. The point which I wish to make is, if you admit the principle that appreciation in land values should be included in the rating base, then there is no escape from the logical conclusion that it should be added into the capital sum whenever it occurs, and the rate of return under those circumstances would be figured upon a capital sum, including the appreciated value of the real estate. Now, with such an appreciation as \$4,600,000, you would find, however, it might be applied that instead of having a surplus here which was deducted from the investment in order to get the capital sum, you would have a deficiency which would be added to the investment and would tend to swell the capital sum very substantially in excess of \$4,600,000.

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(This last table was received in "Exhibit 198" as Table A.)

Mr. Metcalf: In Plaintiff's Exhibit 201, fair rating base and return, my attention was called to the fact that during the year 1907 to 1908 the enjoined rates were not the ordinance of 1902, plus 15% excess rates, but were the 1902 ordinance rates; in other words, the Board of Supervisors sought to reduce the rates to a point below the 1902 rates in that year. I find in looking at the record that the stipulated, or agreed excess earnings over the ordinance earnings were \$250,000, therefore on page 2-A of this exhibit that there be added to the note which appears at the head of the table, which reads "Revised "April 15, 1916, to exclude from the actual receipts 15% excess "charges over ordinance rates" these words, "As to years 1908 to "1915, and stipulated \$250,000 excess over ordinance rates for 1907 "to 1908"; and that on line 6 to the legend, "Actual gross revenue, "excluding enjoined 15% over ordinance", these words be added, "For years 1908 to 1915, and \$250,000 for 1907 to 1908", and that in the column 1907 to 1908, on line 6, the amount \$2,064,000 is changed to \$1,814,000; in the same column, on line 7, change the amount \$901,000 to \$651,000, and upon line 8 the resulting percent to 1.8%.

O'Shaughnessy Witness: M. M. O'SHAUGHNESSY for Defendants.

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DIRECT EXAMINATION BY MR. SEARLS.

I reside in San Francisco, and am City Engineer of the City and County of San Francisco. I am 52 years of age.

I graduated in engineering from the Royal University in Dublin in 1884. In 1886 I was assistant engineer for the Sierra Valley Mohawk Railway, Plumas County, California. From 1886 to 1888 assistant engineer, Southern Pacific Co.; survey and location of lines Ventura to Santa Barbara; Willows to Fruto; double track Port Costa to Berkeley; West Side Railroad from Tracy to Tulare; sounding San Pedro Harbor; townsites Niles, Tracy, and towns in east side of San Joaquin Valley, from Fresno to Porterville. From 1888 to 1889 engineer Eureka Rancho Improvement Co.; Santa Isabelle, Hot Springs Land & Water Co.; Tamalpais Land & Water Co.; Belvedere Land Co.

From 1890 to 1899 private practice as civil engineer in San Francisco, engaged in all kinds of engineering work, holding during that time the position as chief engineer of California Midwinter Exposition, 1893-94, including roads, water supply, and sewage in that project. 1895 to 1896 chief engineer Mountains Mines, Ltd., Shasta County, afterwards the Mountain Copper Co. City of Vallejo water supply; Holy Cross Cemetery water supply; location of railroad from Port Hartford to San Joaquin Valley; in 1898 made surveys of the Spring Valley Water Company down Niles Canyon, locating the present aqueduct.

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1889-1906, consulting engineer in Hawaii for the following companies having water supply systems: Wailuku Sugar Company, American Sugar Company, Molokai, Hawaiian Sugar Company, Kauai, including the Olokele Aqueduct, 13 miles long, 60 million gallons per day; Hutchinson Sugar Plantation; Paauhau Sugar Company, Kilauea Sugar Company; Pioneer Plantation Company, Lahaina, Maui, Hawaiian Commercial and Sugar Company, Maui, including 10 miles of 19 million gallons per day, Koolau Aqueduct; Kohola Ditch, Hawaii, including 20 miles of 60 million gallons per day aqueduct; Ohau Sugar Co., and several others, including in all about 20 separate corporations in Hawaii.

1906-1912, from June 1, 1906, to September 1, 1912, consulting engineer, San Francisco, including reports on water projects in Shasta and Marin Counties; construction engineer and chief engineer Southern California Mountain Water Co., from June 1, 1907, to September 1, 1912, including active charge of design and construction of Morena Dam, Dulzura Conduit, and other features of San Diego's water supply; construction of dam for Meloche and Thompson, near Raton, N. M., 900 feet long, 70 feet high. Construction of dam for the Crocker-Huffman Land & Water Co., diverting the Merced River into this canal. Consulting engineer in active charge of Port Costa Water Co., including development of supply works at Concord and distributing system toward Martinez from Port Costa. Investigation of artesian belt south of Tulare Lake. Consulting engineer for Spreckels Sugar Co., for reclamation works along the Salinas. 1912 to 1916, from September 12, 1901, to date, City Engineer of the City and County of San Francisco, involving charge of various engineering works that have been prosecuted by the city.

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I am familiar with the properties of the Spring Valley Water Co., and acquired that familiarity from residence here for about 31 years, and from active acquaintance with the ground, and being over the various properties at different times, and also during my frequent investigations and examination as City Engineer when delineating the lands necessary for condemnation purposes.

(Map of certain general subdivisions of the Spring Valley properties in use or not in use, introduced and marked "Defendants' Exhibit 206".)

Mr. O'Shaughnessy: This is a map of the Spring Valley Water Co.'s properties, showing classification of watersheds and reservoir lands as in use or not in use. The heavy lines indicate the exterior boundaries of the different watersheds that are tributary to the source of supply; the lands included in red are those owned by the Spring Valley Water Co. in or adjacent to the watersheds classified as in use; the color yellow indicates the land owned by the Spring Valley Water Co. in or adjacent to watersheds classified as not in use, and the green

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line indicates lands not owned by the Spring Valley Water Co. in watersheds. The color dark red indicates non-watershed lands owned by the Spring Valley Water Co., and the line colored brown or orange indicates non-watershed lands owned by the company, classified as not in use.

10,503 The tract containing the lakes, including lake surface Spring Valley Water Co., gives the area of lake surface as 336 acres. This is in relation to the Lake Merced lands. The area as measured in the City Engineer's Office from maps furnished by the Spring Valley Water Co., is 376 acres at maximum high water, which equals 31 feet on gage at pump station, or approximately 22 feet above city base, which includes 249 acres, in south lake, and 118 acres in north lake, a total of 811.13 acres.

I have been familiar with Lake Merced and surroundings nearly 30 years, and believe, for purposes of water supply and sanitary protection of same, that the 811.13 acres indicated on the exhibit provides an ample margin for water supply purposes. This area includes 336 acres submerged at the ordinary levels of the lake. Adequate protective measures have been taken by the Spring Valley Water Co. to exclude, by diversion, all inflowing contamination from outside sources. On the west side of the lake is a brick-lined canal, 6 feet deep, 6 feet wide at the top, and 4 feet wide at the bottom, which leads to a brick-lined tunnel 4 feet by 7 feet in size, 3,035 feet long, which discharges all matter into the Pacific Ocean. This main system is fed by two branch feeders, one 22 by 24 inch flume from Vista Grande, and one 2 feet 10 inches by 3 feet flume from the Ocean View section, so that all of this drainage is amply provided for. To the north of the north lake is a 24-inch cast-iron pipe sewer, which leads from Ingleside Terraces to the Sloat Boulevard main sewer, and thence through the Sunset Section to the Mile Rock outfall.

I am familiar with the use of the lands, this 811 acres, for much of the period 1907 to 1915, the years in which the rate matters were in controversy. This land has been principally used for agricultural purposes, but I believe the near future uses will be for suburban residences like Ingleside Terraces and St. Francis Wood, for which this property is well adapted. I believe that the future use for this purpose will demand no heavier sanitary requirements than those heretofore utilized for protecting the water supply.

10,504 A carefully located boulevard has been studied to surround the lake which by proper gradients will furnish automatically additional security for lake protection. This boulevard is located exclusively inside the 811-acre tract. It is not the custom or practice in water-works supply to hold immense areas of land, especially inside the city limits, under the pretext of water protection.

In July, 1913, I made a careful examination of all the reservoirs and watersheds, in the New York Croton aqueduct system. I found

that out of 360 square miles of watershed yielding 336 million gallons daily, the City of New York owned only 21,364 acres, or 33 square miles, or 9.2% of the total area of the shed. Of the 21,364 acres owned, 12,364 acres, or 58% were in reservoirs, and only 9,000 of a border strip was utilized for protection purposes. The total storage capacity of the reservoirs in this system was 104 billion gallons.

In the Ashokan system the land acquired recently by the City of New York, the entire acreage is 15,222 acres, of which 8,180 acres is reservoir area, and the balance border strip. None of the Croton system is within the city limits of the City of New York, and none of the Ashokan system is so situated.

The increase of the organic contents of the Lake Merced water during the last two years I would say positively is not from increase of watershed population. It is from the manner in which this land surrounding the lake is used for farming purposes, in which large volumes of both horse and stable manure are placed on the ground for fertilization, and in that way there must be some infiltration of the manure contents into the lake, which would account for its inferior sanitary qualities.

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If the Spring Valley Water Co. during the period 1907 to 1915 had reserved for its own use around Merced only that portion which is marked red on the map, and had disposed of the portion which is marked yellow on the map, there would be no more danger of contamination than under the present uses; in fact, a lesser danger, because the only other uses besides farming purposes that the land could be put to are uses for building purposes, and nobody may build a building in San Francisco, except that proper arrangements are made for sewage, so that all matter resulting from building purposes will be removed from the lake, and there would be no chance of its reaching there.

Peninsula watershed: The lands in use as reservoir basins amount to 2,058.91 acres. The lands in use for watershed areas, the area given here, includes about 400 acres not actually in, but adjacent to the watershed, which, if segregated fall into several isolated parcels of little value, 17,613.07 acres; total 19,671.78 acres, or 30.74 square miles. Area not tributary to the peninsula reservoirs, but adjacent thereto, excluded as not in use, 4,390.04 acres, or 6.86 square miles. The area on the entire Peninsula watershed is 35.30 square miles. The area of watershed owned by Spring Valley Water Co., 19,671.98, minus 400 acres, equalled 19,271.98 acres, or 30.12 square miles, or 85% of total watershed. The percentage of submerged area to owned area is 10.5%. My understanding is there seems to be no controversy as to the lands in use tributary to the Peninsula system.

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Lands of the Spring Valley Water Co. in use and not in use, watershed above Sunol Dam in Alameda and Santa Clara Counties:

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Lands in use during the entire period covered by all the rate suits: Pleasanton Wells tract, south of County Road No. 2000, 654.426 acres. Laguna Creek lands below Pleasanton Wells tract, 192.41 acres; Sunol drainage area—gravel beds and adjacent hillsides—this area includes 129.04 acres of the Niles Canyon lands below Sunol Dam and not in use, for which no deduction is made, 7660.69. Total 8507.526 acres.

Lands brought into use in November, 1913, by the operation of the G line of wells, north of County Road 2000 and south of Arroyo Valle Canal, 313.684 acres.

Total lands in use since November, 1913, 8821.21 acres.

Lands in the watershed area but not in use:

Pleasanton Ranch lands, north of Arroyo Valle Canal, 4641.50 acres.

Part of Nusbaumer tract, Laguna Creek, 509.61 acres.

Part of Stone Ranch, north of Alameda Creek, just above Sunol Dam, 729 acres.

Other lands on watersheds of Arroyo Valle, San Antonio, Upper Alameda and Calaveras Creeks, 33,263.91 acres.

Total 39,144.02 acres.

Total in use and out of use 47,965.23 acres.

The summary of the areas, assuming the entire watershed at 100%, is as follows:

SUMMARY OF AREAS	Area	Ratio of Entire Watershed
Entire watershed above Sunol Dam.....	620.54 sq. miles	100%
Lands in use previous to Nov., 1913.....	13.29 sq. miles	2.1%
Lands brought into use Nov., 1913.....	0.49 " "	0.1%
Lands in use after Nov., 1913.....	13.78 " "	2.2%
Lands not in use at any time.....	61.16 " "	9.8%
Total, lands in use and not in use.....	74.94 " "	12.0%

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Watershed above Sunol Dam in Alameda and Santa Clara Counties. I have been familiar since 1893 with Alameda County properties involved in this case. Made the original surveys and plans in 1893, for the drainage canal leading northerly from the junction of the County Road No. 2000 and Arroyo de la Laguna for the original owners of this property before it was planted as a hop ranch. For the past four years I have been supervising studies of its water productiveness and the physical characteristics of the underlying strata. An area practically of 6 miles long by 2 miles wide near Pleasanton has been closely scrutinized and frequent observations taken of the rise and fall of water in the water planes in this zone. Much erroneous information has been published with regard to the productive capacity of the water supply of this little valley. Careful measure-

ments of the water extracted for a series of years, made under my direction, shows the average yield to be less than eight million gallons per day. The attempt to withdraw a larger quantity of water would result in an immediate lowering of the water planes supplying the underlying gravel tubes and difficulties with the land owners adjoining on the east. In December, 1913, after two years of continuous drought, the water plane lowered as much as 50 feet within a mile of Livermore and gradually tapered to the pumping station. All this water was withdrawn by pumps from the lower cone of land south of Road 2000, containing 654.4 acres. The ownership of additional land for the period up to November, 1913, so far as water abstraction is concerned, was unnecessary. Since November, 1913, however, 313.684 acres should be added, which will bring the total area including the Sunol lands in use up to 8,821.21 acres, and of course the right to lower the water plane beneath the adjoining tracts owned by the company through pumping operations should be reserved. I have made a careful examination of the Sunol drainage area, and believe that the 7,660.69 acres shown on the accompanying map includes all areas in that zone properly tributary to the diversion works at Sunol, and the gravel beds, or necessary to preserve the supply from contamination. If the Spring Valley Water Co. had permitted these watershed lands above Sunol to pass into the hands of other ownerships prior to the years in controversy, it is my opinion that the supply would not be endangered. There is a state law which prevents persons from doing any acts which amount to an actual pollution of the water supply.

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The price paid by the City for the construction of a road from the Hog Ranch into the Hetch-Hetchy Valley was 67 cents a cu. yard. I am familiar with the construction of that road, and it would be a little more expensive construction than would be necessary for flume benching in solid rock, because the roadbed is wider than the bench for a flume, and also because in railroad construction you are compelled to use curves of 190-foot radius, which very often brings you into thorough cuts through points of a hill, and thorough cuts are much more expensive than side cuts. In flume construction you could use a comparatively shorter radius, and avoid having cuttings, and therefore have a smaller throw for your material.

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Hetch-Hetchy Water Supply, Estimated Cost of Works: Plan "A", for a system to deliver 60 million gallons to San Francisco, at an elevation approximately equal to that of University Mound Reservoir, 170 feet above city base, \$40,747,000, or a cost per million gallons of daily delivery \$679,000. Plan "B": cost estimate for a system to deliver 120 million gallons daily to Irvington, with a pipe line to deliver 60 million gallons daily to San Francisco, at an elevation approximately equal to that of University Mound Reservoir, 170 feet above city base, and pipe line to deliver the remaining 60

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million gallons to Oakland, San Jose, and other communities in the San Francisco Bay Region, \$48,747,000; cost per million gallons daily delivery, \$406,000.

Plan "C": Cost estimate for a system to deliver 160 million daily to Irvington, with pipe lines to deliver 100 million gallons to San Francisco, at an elevation approximately equal to that of University Mound Reservoir, 170 feet above city base, and pipe lines to deliver the remaining 60 million gallons daily to Oakland, San Jose, and other communities in the San Francisco Bay Region, three pipe lines across San Joaquin Valley, two pipe lines from Irvington to San Francisco, \$58,612,000, or at a cost per million gallons daily delivery of \$366,000.

Plans A, B and C contemplate building the mountain section of our aqueduct from the early intake to our power plant at Moccasin Creek of 400 million gallons a day capacity. The tunnel from Moccasin Creek to Oakdale Portal will be of 200 million gallons a day; the tunnel through the Mt. Diablo Range will also be 200 million gallons a day capacity; but the plan of the pipe lines is designed to be on a progressive basis, pipe built of a certain size to take care of the consumption for a certain number of years, and afterwards when the demand comes for a larger supply, to lay a second pipe line across the San Joaquin Valley, and from the Irvington Gate House into the City of San Francisco. This contemplates, as this policy is committed, to acquire the local Peninsula supplies, but if the City did not purchase those supplies, and was bringing 120 million gallons a day, approximately, as the first unit of construction, the cost would be materially reduced, because then instead of making two pipe lines across the San Joaquin Valley, each with a capacity of 60 million gallons per day, one pipe line would be constructed with a capacity of 120 million gallons a day; this would reduce the cost of Plan "A", and known as Plan B-1, to \$46,247,000, or at a cost, per million gallons of daily delivery, of \$385,000.

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Plan "C-1" on a similar basis, building a pipe across the valley, 160 million gallons a day capacity, as the first unit of construction, would make a material reduction in the cost of Plan "C", and reduce the total estimate to \$51,712,000, or at a cost per million gallons of daily delivery of \$323,000.

If the City should not acquire the Spring Valley property, then we should use Plan "B"; that is, assuming that the Spring Valley water supply would no longer be available to San Francisco. If the Spring Valley supply should continue to be available, and the remaining bay cities should desire to secure additional water from mountain sources, I would recommend Plan "C-1" as the plan of first construction.

Plan "B" provides for 120 million gallons per day. On my forecast the increased population I figure that in 1935 the consumption

will be 79 million gallons daily; that is, 20 years from now, or very nearly double what it is at the present time. In making that estimate, I figure on 100 gallons per capita consumption daily. Plan "B" would be exclusively for San Francisco, assuming that the Spring Valley Co. were not here.

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The reason I have eliminated interest-during-construction in these figures is that our Hetch-Hetchy water supply proposition is for a dual purpose; besides creating a water supply, incidentally after we build our Hetch-Hetchy Dam, which will be completed in 4 years, and the first 19 miles of aqueduct, we shall have a hydro-electric plant, capable of creating about 50,000 hydro-electric horse-power; in fact, under the terms of our grant, we are compelled to utilize this hydro-electric horse-power. The potentialities of that power are very great, much more than any interest that could be charged against the project of a 60-million a day plan. If the power value were excluded, I figure the interest would come to about \$6,380,000. If the 120 million gallon plan were to be constructed, the interest would be \$720,000 in addition. If the 160 million gallons a day plan were constructed, the interest would be \$448,000 in addition, but our power values are so much in excess of the interest charges that the interest charges may well not be included in this estimate.

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Our ultimate power estimate will go to very nearly 225,000 horse-power; the first unit of 50,000 is merely an adjunct to our construction. There are many features going to determine the value of a horse-power, the price of fuel, price of the plant, and the development of the Diesel engine. Speaking broadly, the power proposition is of very great value. The Army Engineers have made some estimates on it; in fact, each horse-power is valued as the equivalent of 5 tons of coal a year; 250,000 horse-power would be equivalent to 1,250,000 tons of coal. If you capitalize that at only \$5 a ton, it would be about \$5,000,000 a year, but dividing that by 5 it would bring down our horse-power value to a million dollars a year, and in my judgment that would be a very moderate figure to pay for our power potentialities.

The price paid by the City of San Francisco for some water rights on Cherry River was \$1,052,000. The estimated yield of those water rights at the time of purchase was from 150 to 200 million gallons daily. That was the estimate of Mr. Hobson and Mr. Harroun. I agree with that estimate. It is substantially between 175 million and 200 million gallons per day, and makes allowance for the priorities of the irrigationists.

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(Hetch-Hetchy supply system, estimated cost, M. M. O'Shaughnessy, introduced and marked "Defendants' Exhibit 207".)

Witness: LEONARD METCALF for Plaintiff.

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CROSS EXAMINATION BY MR. SEARLS.

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Referring to Exhibit 198, Table 9; this table shows that even if I have taken into account the average appreciation in land values any deficit in return which may have been incurred, in the early years of the plant life was wiped out in the year 1902 and before that time. There were certain years within that period in which there was a deficit, but the deficit had been offset by the surplus earnings in subsequent years, so that as of the year 1902 there was no deficit upon the assumed hypothesis. When I speak of the fair cost of money without profit, I have not used exactly the same basis for figuring that Mr. Lipman and Mr. Weeks used. I have based it essentially upon what the Company itself has done with such borrowings as it had to make. I took into account the discount and the cost of putting through bond issues and so on in reaching that rate, but the essential difference was that the security behind the loan is a very substantial factor in determining the rate. During this period of time the borrowings, as measured as a part of the entire value of the company, have been comparatively small. You would be face to face with a very different condition of affairs if you were to attempt to reproduce the works as a whole to the condition in which the company has found itself, let us say within the last 20 years, for instance.

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I think that so far as the past history of the company throws light upon it, that it could have gone out and borrowed money at the rates which I have indicated for investment purposes. Assuming that the amount of construction was at no time greatly in excess of the actual borrowings; that is, I doubt if during this period of time prior to 1902 it could have gone into the market and borrowed enough to reproduce the property, or a very substantial part of it, at the rates therein indicated. When they originally constructed the larger units of property, the company did it, but what I wanted to call attention to was that the steps in which they did it constituted a comparatively small part or ratio of the entire value of the property; meanwhile, the existing property had been appreciating in value rapidly, so that the security upon the loans was unusually good. I think that the appreciation in land values prior to the year 1902 were substantially more than 2% per year on the average. I think I have in the indications of property increases, as shown in Mr. Grunsky's exhibit, reason to so think. It is my impression that the increase probably was more than 2%, but I don't know what the actual increase was from year to year. There may be something in the idea that there was a long period of time in the seventies and in the eighties when there was no appreciation in value, and then in the nineties it took a rather rapid jump, and then there was a period

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of cessation up to the time the automobile came into use, when the Peninsula values developed rather rapidly; I don't mean to imply that I think the rate has been uniform, because I do not. I don't think that real estate advances in that way generally. All that I meant to say was that I have not accurate information, and I don't know how to get it; it is exceedingly difficult to obtain.

As to whether the showing of the Company from the beginning of its existence up to 1902, was that it had earned the percentage cost of its money on the fair average value of its real estate, plus the original cost of its structures, is difficult to say; if you eliminate the appreciation in value, I should say unquestionably yes, they had done that on the average. I tell you frankly that I am inclined to think that 2% allowance is too little, and that the greater part of the allowance came very slowly toward the latter end of the period, and that one influence would offset the other. Just what the ultimate effect would be, I do not know. I was not able to get data of which I felt I could predicate a certain judgment. That is one of the cases, in other words, where the influence of the compounding of money is very marked.

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Taking 1898, where I had a margin of a million dollars, or something over; if the appreciation were more than 2%, that might allow for quite a variation in the compounding effect. It would depend upon the data, and when the appreciation took place. I feel that you are trying to narrow down my reply a little more closely than the evidence which we can adduce justifies. I have admitted that if you exclude the appreciation in land values, the company has earned more than the assumed fair cost of money rates. If you take that into account, one cannot, of course, say with certainty what it has done in any year prior to the present. The indication is that it has earned, probably, something in excess of the assumed fair cost of money up to the period of years, but not after the period indicated hereon, about 1902 or thereabouts; that is as far as I feel that the evidence before me justifies me in going. Judge Farrington's findings as to the value of the structures in 1903 was about \$13,378,000.

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Mr. Sharon: Judge Farrington's figures for the undepreciated structures were \$16,301,000, including overhead and interest at 12½%. It did not include structures out of use. It is my idea that that figure is comparable without our \$16,713,000 for the year 1903, except that our figure on this table of 1903 does not include any overhead.

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Mr. Metcalf: Judge Farrington's figure was \$16,305,000 as against our figure of \$16,713,000. We excluded certain overhead costs, and put those into operating costs, because, in the majority of cases we had no evidence of the overhead costs, and that was the safer basis on which to make a comparison. I assumed that the overhead costs had been taken care of in operation, and this table is made up on that basis. So far as this table is concerned, it does not

make any difference whether they are included in one place or the other up to the time when you begin to earn a surplus; then, of course, it would make a difference. It is my impression that this \$16,000,000 plus, which I have taken as the original cost of the structures in 1902 was, so far as Judge Farrington's findings show, not very different from the original cost of the structures; that is, leaving out of the question overhead, and leaving out consideration of the accrued depreciation.

10,526 This is a statement of the original cost of the structures, and Judge Farrington's finding purports to be a value of the structures. Assuming Judge Farrington's hypothesis that the value of the structures, including overhead, was a value approximately the same as I have given as the original cost, I think it would be true that the value and original cost with overhead could not be very far different. If you are asking me to comment on his overhead allowances, I should disagree with the Judge; I should think that his allowance was too close on overhead and interest-during-construction.

10,527 So far as I am able to say, the return which the Company had earned on the value of its property, perhaps in the vicinity of the year 1900, including the value of structures, and the value of land, it certainly approached at least being equivalent to the fair cost of money since the beginning of the plant's history.

If the Company had earned the fair cost of money since 1900 from year to year, I conceive the situation here that the Calaveras work would have gone forward before this, and reinforcement of the distribution pipe system would have gone forward, so that I am inclined to think the Company would have had very substantial additional investment to carry within the past period of years.

10,529 As to whether, if there is no marked increase in construction, the rate of return would remain substantially the same upon the fair value of the property throughout that period of time from 1900: I should say probably it would not have remained the same, because I am inclined to think that the rate of appreciation in value would have been greater than the increase in net revenue of the Company, and so it would in effect have meant that the Company would have gotten a somewhat smaller rate of return at the end of the period than at the beginning of the period. That would have been due to the addition of large units of construction, so far as the historical development of the property shows, but you have asked me to eliminate from consideration the thought as to what I believe would have taken place, to-wit, that the additional construction would have been undertaken in this period of time. Of course, if it had been undertaken, as I believe it would in that period of time, there would have been still further reduction in the rate of return earned.

10,531 Apparently, from a casual inspection of this Table 9, the deficit

after 1900, or 1901, was due to several causes; one the appreciation in land values assumed, another the rather substantial purchases of lands at one or two points in that period of time; the losses growing out of the earthquake were also a factor, and the increasing depreciation allowance, and of course, the loss in revenue at the time of the earthquake was a substantial factor. If his Honor should adopt this Wisconsin Railroad Commission's method of finding the capital sum, the portion of that amount, it is true in general, which I have designated here as development expense is not really development expense incident to building up the property, but it is a capitalized deficiency in return resulting from other causes, possibly, principally appreciation in realty values, and possibly reduction in rates; this method has to do essentially with deficits in fair rate of return, and not essentially with the cost of advertising and other things of that sort to build up a business. The one central idea in the method is that the property owner should be entitled to collect, year by year, a certain fair rate of return upon investment, and failing in that earning, then the deficit created by the failure must be added into the capital sum until it is wiped out subsequently by excessive earnings, or by earnings in excess of what otherwise would be required to meet simply the fair rate of return.

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If you can separate the two following ideas in this way, first, that history shows that the Company, up to date, has not been compensated for its actual development losses, that possibly those losses should be capitalized and added to whatever value his Honor finds for the property today as a proper development charge; second, as to whether those actual development losses, as distinguished from deficiencies which may have resulted from legislative action, or appreciation in land values, had not been compensated long prior to the time when this unpleasantness commenced to arise; I think it probably is true that the development expense, as so defined and limited, has been satisfied, but there still would remain at the present time the deficit created by failure to earn a fair return on the appreciation in value of the real estate, and resulting from the reduction of the rates to a point where you were not getting a fair return on the fair value of the property. I meant appreciation in real estate since the property was bought.

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In a sense, I think that the capitalization of these deficits since 1900 or 1901 had nothing really to do with the value of the property as it is today, but in another sense, I think that it did have. This is only one of the yardsticks in determining value, and you can carry it to absurd limits on the one hand by assuming that the losing venture is the most valuable property, or, on the other hand, that the most successful company which has wiped out those expenses is the least valuable. Of course, the one is as absurd as the other. This is of interest, perhaps, in connection with a consideration of

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original costs, and so many assumptions have to be made that I think it cannot be tied to too closely. It really has very little to do with original cost when you consider the source of the deficits for the last 12 or 13 years; it then becomes a question largely of appreciation in the value of real estate. Even though this method of computation showed that you had had excess earnings, and that there was no development expense in the sense of being an excess of deficiency over surplus earnings, I should not conclude therefrom that the value of the property was less as a going concern; in other words, the method as a yardstick is not of any assistance to you in forming judgment, because I think it goes without saying that property with established business must be more valuable than the property without an established business. My idea is that it could only be applied where you are dealing with a comparatively recently built property, and where the development of a plant had been more or less normal, and there were no grossly excessive profits, or no gross deficiencies. I think the longer the period, the more speculative it becomes, and the less important to the man who judges the value of the property; in other words, the man who buys the security of the property, or the community which has the service.

There were deficiencies at the very beginning in the early sixties, but in the seventies the profits of the company were very good. I would not say that they were grossly excessive as measured by current rates upon properties upon the Pacific Coast at that time. Rates were very much higher. If you were to compare the rates which were earned then with the rates of today, of course they would be excessive, and if you were to compare the conditions with our viewpoint of today, neither of which would be fair. I would say that the deficiencies which were incurred during the first five or ten years of the plant's life were fairly in keeping with what you would expect.

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Referring to Table 7, which indicates my comparative method; my development expense does not include preliminary expense in corporation and promotion; engineering and superintendence expenses; legal expenses; administration expenses; general and miscellaneous expenses; discount and cost of marketing securities; contingencies, omissions, etc.; in some cases interest-during-construction costs; and taxes during construction. I have included in the reproduction cost the allowance for the overhead, everything, except the discount upon the bonds, and that I considered as being part of the rate, item 6, discount and costs of marketing securities. I think elsewhere in my testimony I call attention to the fact that while some of the rating commissions, as New York, for instance, do allow for that, others do not, and I have always been in the habit of considering it as part of the cost of money. For the purposes of this discussion, of course, I have included in the cost of the comparative plant a reproduction

cost estimate of the property which does include the engineering, superintendence and overhead, and the interest-during-construction item. I think my overhead charges include all these which I have enumerated, except item 6, "discount and cost of marketing securities". In overhead and interest-during-construction I include all these items, except, I think, the discount on securities. When I came to discuss the question of development expense, I meant something in addition to these items which I had already included in my overhead.

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It is my understanding of Mr. Hazen's reproduction inventory of the distribution system that he included in his items for services the cost of connecting the taps with the mains, so that I think whatever cost was incidental to the physical act of connecting the taps with the mains is included in the reproduction cost of the distribution system. At least, I have not made any addition for the cost of digging up the mains again and re-connecting them. The company had approximately 63,016 taps in 1913. If one were to assume that all these consumers were ready and willing to be taken on as fast as their taps could be connected, I should suppose offhand the physical connections could be made in a period of 2 years. I assumed that the distribution system would be built within a period of about 4½ years. I would start my distribution system along with the first units of construction. You would, in a measure, make the physical connection of the taps with the mains as you went along, but not wholly, because people won't all come to it immediately. I have not assumed that just as soon as the pipe is laid in a given street, immediately all of your connections would be made, and your income derived.

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On the assumption that the consumers were all willing to come on as fast as the connections could be made, there is no reason why the taps could not be connected with the mains during the course of the 5 years in which this distribution system was constructed, and on that assumption, if that were the case, by the time the distribution system, and the rest of the plant were completed, all you would have to do would be to turn on the water.

It would have been pretty difficult with your rainfall conditions here to supply the consumers existing in San Francisco prior to 1913 from private wells or cisterns; I mean to say, the distribution is so irregular that something else would have been done, in fact, before you got to a city of any size. I don't assume that with the present development of San Francisco that a supply from Islais Creek could be used for domestic purposes. I believe that so far as it could be made safe, the water of Lobos Creek might supply a small part of the population, but it would not take care of a large part of the population of the city. Undoubtedly you would have gone to the Peninsula sources by this time with a population of this size. I think it means, practically, unless you apply the yardstick

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10,540 along the lines which experience has indicated as generally prevalent, this method of computation would cease to become a yardstick; in other words, to say that the services are all there, and can be connected up at a moment's notice, does not give you then a measure of the cost of developing the business of the company. I am inclined to think that it is true that if the services were not connected, and the people had been dependent upon wells and other local sources of supply, that the assumption is absolutely inconsistent with the idea of a population of the density of that of San Francisco; if, on the other hand, you apply your yardstick along the line which experience has dictated as applicable elsewhere, only shortening your period of time, it may shed some light upon the question. It is not conclusive, none of the methods are.

10,541 New Orleans had the Mississippi River from which local supplies could be drawn in small quantities, and were drawn, as a matter of fact, prior to the time that the municipal works were constructed, though I think it is true that much the greater part of the supply came from cisterns. The rainfall in New Orleans is larger than that in San Francisco, and it is more uniformly distributed. Your difficulty here is that the distribution is so irregular that I think the conditions would be worse here than in New Orleans in that respect. There was more ground water, undoubtedly, there, than in San Francisco. Comparing the type of population in New Orleans with that in San Francisco, from the point of view to take on a new municipal water supply, of course, the negro population does not take as much water as the white. On the other hand, the climatic conditions there are such as to produce a greater per capita consumption than in San Francisco. It is true that the citizenry of San Francisco might be more willing to connect up with the water supply than the negroes and poorer whites that make quite a large element in the New Orleans population, although I think it is actual need, or the idea of the convenience of the service that induces people to connect rather than any local pride.

10,542 I think it is a logical assumption to think that if the Spring Valley supply were not here that the City would have long ago obtained its own supply. It is hard to conceive that under such climatic conditions as these, and with the knowledge of the convenience of water, that you could have so large a city as this in this country without a water supply. Of course, if you go to the continent you will find communities which do not have the water supply in the way that we do, and do not have the convenience of the water under pressure. That is, they have public wells, and points at which the public can draw water. Of course, it would have been absolutely essential to San Francisco to have water to make it possible for the city to remain here.

Undoubtedly the Spring Valley has been a factor in the develop-

ment of San Francisco, and reciprocally, the development of San Francisco has been responsible for the enhancement in value of the company's San Francisco and Peninsula real estate. A competitor furnishing water to the city could not build up the same business, because I have assumed that this company has all the business; if there were two companies competing, of course, the business would be divided. Making that assumption, my development expense of a comparative plant is very apt to amount to the cost of driving a competitor out of business entirely, for unless the competitors divide the territory, there is pretty certain to be a loss. I think in general that the Spring Valley Water Co. has always had a virtual monopoly as against any except municipal competition.

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Mr. Sharon: One of the old attempts to start competition with the Spring Valley was by the purchase of what was called the Peninsula Water Co.

CROSS EXAMINATION BY MR. SEARLS.

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Mr. Metcalf: Taking the plant as it was in 1913, I would not think that any sane investor, with the possibility of the municipality itself competing, would undertake to build a competing water supply system, including the distribution system.

I should not say that it was quite a fair statement, with reference to the experience of New York and Boston in the construction of the new and auxiliary water supply to say that the situation, so far as the time of development is concerned, is comparable only with the basis of supplying water wholesale to the owner of a distribution system already having its consumers. In any waterworks system from time to time you are likely to have to make construction, in the obtaining of additional sources of supply, which it will be difficult for you to carry through the agency of the rates for a period of a few years at all events. In Boston certain communities came into the district which had not before been supplied by the city, but they had their own distributing system; you mean to differentiate between the fact that the city itself owned the distribution system, and the Metropolitan Water Board was a board constituted to bring in the new supply for the benefit of the various communities that might use it? In a general way it is true that the figures shown here take into account of constructing storage works and supply conduits, but do not take into account the normal additions to the distribution system during the years in question; it is not wholly true, because in both cases very substantial reinforcement of the pipe distribution system has been required. The period of time in figuring development expense is shown on page 10-a of "Plaintiff's Exhibit 198". I think that you are probably correct in stating that those figures do not include any part of the distribution system. I think in the Boston case that the distribution system is excluded from that; the Weston

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Aqueduct Line brings the water down into a reservoir, but did not bring it into town; that was connected with the Brookline Reservoir, and then there were connecting lines with the distribution system, and with the Spots Pond Reservoir, and the Fells Reservoir. In that sense, they were supply means for increasing the pressure of the water in the city. Assuming that you are correct, the period of years shown in column 5 does not refer to a period of years during which consumers were being taken on, but rather to a period of years during which the works themselves were being constructed. That is true of all of these; this table was given merely for the purpose of comparing my construction period assumption of 6 years with the actual period incurred in these various works in building works. It had nothing to do with the time of acquiring business.

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It is true that the entire capacity of the present Spring Valley works is being consumed by the City of San Francisco as limited by the conduits, but not as limited by the water rights or the reservoir capacities. The entire capacity of the works, as measured by the valuation which I have made in this case, is at the present time being consumed by the City of San Francisco and its inhabitants. If I assumed that there were a company which owned the distribution system, and either had no supply, or had a supply that was so unsatisfactory that it was to be discarded, and the Spring Valley supply substituted, I don't think that I would then have a situation which was more comparable with my Eastern parallels than the one which I have drawn, where the entire business of the company must be built up from the ground; in the case of these Eastern companies, while certain business was awaiting them; in other words, they were in need of additional water, the entire capacity of the works was not immediately taken up; it had to be carried. In the sense that those Eastern companies were bringing in more water than the locality immediately needed, whereas the Spring Valley Water Co. is bringing only that amount of water which is immediately needed, those situations might not be comparable; that is merely putting in different words the idea that I have already expressed by saying that portions of the work are under-built, portions are in a normal state of development, and other portions are over-built. I am referring now to the Spring Valley system. For instance, in the sense of a normal building, I have said that the reservoir system, and the pumping stations were in a normal condition; I have said that the distribution system, in part, needs reinforcement, and to that extent was under-built, and that the conduit system was essentially under-built. I do not think that I have referred to any part as being over-built. It seems to me that the rights which have been acquired, only take care of a reasonable future in advance of us; of course, the moment that you build your Calaveras supply, the Calaveras conduits will be over-built so far as the plant is concerned, and the Calaveras Dam in

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the same way you can consider as being over-built when it is finished, for a few years; that does not mean over-built in the sense that it is not advisable to do it, but merely that you have not gotten to a point where you are using the new works to their full capacity. The total supply that the Calaveras Conduit will bring in with the first installation on the assumptions made, is 30 million gallons; when the pipe is new it will be somewhat more than that, because that 30 million computation is based upon pipe which has shown the effect of time, age. I do not remember now, exactly; it may be increased 15% or 20% above that figure; 30 million is the figure which we have used, and which Mr. Hazen used as based upon the assumption of a certain coefficient corresponding to pipe 20 or 25 years old.

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Questioned by Mr. Greene.

I used these Eastern figures purely in order to get a comparative construction period. My construction period I assumed as six years, and a year and a half, to two years of it was used up in making plans, and acquiring real estate in advance of construction, beginning the construction of the distribution pipe system perhaps in the last six months of the second year of the investigation and planning period, and then requiring after that four years of additional construction, making the active construction period something less than five years. Now, for comparison with that I have given you here a statement of preliminary investigation period of certain works, and the actual construction period involved in building certain waterworks in different parts of the country; it had nothing to do whatsoever with the period of development of business, or acquisition of business, or the consumption after it was built.

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Questioned by Mr. Searls.

I was not taking this period here as indicative of a part of the period that was necessary in order to build up the business; that period I have called the period of acquisition of business in contradistinction to the construction period. New Orleans was the only comparable case. I referred to Los Angeles, but that is not strictly comparable, because of the different nature of the construction.

I should not be willing to admit that Mr. Grunsky meant that his allowance for going concern should cover the interest-during-construction item; he may have, I don't know what the facts are. If that is a fact, it may be that it would leave the Court very much in doubt as to whether this going concern had covered expressly what it means, or whether it did not cover a good portion of overhead in addition.

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(Referring to the table of cases incorporated in this Exhibit 198: Witness stated that the Des Moines Water Co. was a rate case, the Denver Union Water Co. was a rate case, and the Rockwood Waterworks case was a rate case, he thought, and the Knoxville Water Co.

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case was a rate case. The Nashville Waterworks case was a condemnation. The Richmond City Waterworks was a rate case, he thought, and also the Green Castle Water Co., and the Ashland Water Co.; and also he thought the Appleton case was a rate case, but was in doubt about the Wisconsin case. The Master was of the opinion that the Pioneer Telephone case was a rate case, and Mr. Greene was of the opinion that the Urbana Waterworks case was a rate case.)

CROSS EXAMINATION BY MR. SEARLS.

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Mr. Metcalf: The Des Moines case was a rate case, the Milwaukee Electric Railway & Light Co. I understand was a rate case; also the Milwaukee Gas Light Co. I think that the Public Service Gas Co., of Passaic, N. J., was a rate case. I am in doubt about the other Wisconsin cases, but it is my impression that the majority of them were rate cases; there have been comparatively few condemnation cases there. In my opinion there should be no difference in the amount of going concern to be allowed in a rate case and in a condemnation suit. It would be the same on the theory that if the property were purchased, with the price included the condemnation value of going concern, that it would have to earn rates on the going concern element afterwards; it is part of the fair value of the property, as I see it.

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Of course, I do not mean to imply justice in handling the problem cannot be done in one of two ways, either as Mr. Hazen outlined, or in the way that I have outlined; that is, you may exclude from your rating base the going concern element of value, and increase your rate of return on your base, or include the going value element in the rating base, and have a somewhat lower rate of return than you would in the other case, but it has seemed to me that the method which I have used was more in consonance with the legal decisions, as I have interpreted them, at all events, and whatever the difficulty of determining the amount of the development expense may be, the effect is not great upon the rates, and it is a more logical proceeding, I believe, to include that element of value in the rating base. You come to exactly the same result no matter which way you do it; that is, your equitable gross revenue is the product of the revenue times the base. Mr. Hazen and I do not assume the same rate. Mr. Hazen specifically referred to the fact that according to his method you would have to increase the rate by something like one-half percent additional to take care of that factor over what would otherwise be a fair rate of return.

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(A volume entitled "Summarized comparison in major groups "gross reproduction cost", was handed to the Master to be used by him if needed, and then in case in the court above, it should ever be wanted, Counsel could go through the same procedure there.)

Witness: J. M. BAILHACHE for Defendants.

DIRECT EXAMINATION BY MR. SEARLS.

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(Revenue and deductions from same revised J. M. Bailhache, introduced and marked "Defendants' Exhibit 208".)

Mr. Bailhache: I have corrected the gross revenue so as to accord with the revenue reported by the Spring Valley Water Co. in the first instance. Then I have made, on page 1 and 2 of Table A such revisions in the revenue as will accord with the concessions made by the city during the discussion of the revenue and operating expenses, and have made the net deductions from my deductions, and the net additions to the operation expenses as I have previously reported them, which these corrections indicate. This shows the revenue chargeable on the Spring Valley books, and is practically the same as the Spring Valley statement, with very small additions, and shown in detail on pages 1 and 2 following.

The operating expenses are taken from Table B, which has three sheets; on the last sheet at the bottom will be found the gross operating expenses of the Spring Valley Water Co. for the fiscal years, and from that the original deductions made by the city in the columns A to H. I think it was "Exhibit 125". To that has been added the operating expenses restored, which now gives the net operating expenses claimed by the city; that is carried back on to page 1 of the original statement, at the top line there, deductions from revenue. Under that is the taxes, which are practically the same as the Spring Valley taxes, except the tax deduction for coupon interest. The impounded money is the same as the Spring Valley accounts, and the bad debts which are now taken on account of the full amount of the water sales being taken above are also deducted, the same as the Spring Valley, and there is a charge for service connections there that the Spring Valley did not have, a small item of \$202; that makes the total deduction to which has been added the depreciation and obsolescence account as charged on the Spring Valley books; that is, the full account of the fund; of the year 1907-08 only half was taken as only half of the year 1908 is considered. No depreciation was set aside in 1907. Then we have the total deduction from revenue, and the net revenue is shown on the bottom line, and below that we have the net capital represented at 5%, 5½%, and 6%, as shown by the net revenue.

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ONE HUNDRED AND FORTY-FOURTH HEARING.

APRIL 25, 1916.

Witnesses: LEONARD METCALF for Plaintiff.

W. A. BOSTON for Defendants.

W. D. O'BRIEN for Defendants.

Metcalf Witness: LEONARD METCALF for Plaintiff.

10,560 (Counsel for Defendants stated that there was no need for Counsel for Plaintiff proving formally the adoption of the ordinances which are complained of in these various suits.)

10,561 (Counsel for Plaintiff advised Counsel for Defendants that unless he heard further from them that it would not be necessary to prove that the hearings in these cases at issue were had before the Rates Committees prior to the time the rates were fixed.)

10,562 Witness: In relation to the reason why there is submitted a forecast of the financial situations and the necessities of the company for the next 6 or 8 years; I thought I had referred to that directly in this way: It seems to me in any rating problem you cannot with fairness consider one single year, take that one single year out of a number of years, without consideration of the general conditions under which the company is operating, and the condition toward which it is looking in the future. With this situation here, particularly, where the company is looking forward to very substantial additional expenditures of capital in order to meet the growing needs of the community, and to increase the capacity of the conduit system, it seems to me that injustice might be done if that fact were not recognized. While it has no direct bearing, perhaps, upon the return upon any one year of the period, it seems to me it is fair to take into consideration what the company is looking forward to; for instance, assuming that the rate of return of the last year or two was such as to make possible the enforcement of the ordinances passed by the city without confiscation, and let us assume that that was not the case for the first few years, it is to be borne in mind that as soon as the additional construction incidental to the development of the Calaveras supply, and the building of a new conduit line bringing the Calaveras water into the city is actually incurred, the company will again find itself in a position where the rate of return will be very substantially reduced, and as I see it, reduced to a point where the return would not be adequate, and it seems to me the Court can fairly take that into consideration in view of the fact that it is not to be assumed that you can practically raise substantially the rates at different times, and then lower them to keep pace with the marked exchanges in capital expenditure. That is the direct bearing, as I see it, your Honor.

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Questioned by Mr. Greene.

The fact that capital expenditures have to be made in public utilities from time to time, and the amount of such expenditures plays a direct part in the fair rate of return, because the moment that you made additional capital expenditure of that sort, a given return in money divided by a greater capital sum yields a less rate of return, and it is not possible that there will be business awaiting the development of the new sources adequate in itself to carry the capital expenditure in such large amounts as will be incurred in the development of the Calaveras supply, for instance.

I heard the views expressed by Mr. Weeks and Mr. Lipman on the subject, as far as the part which new construction plays in requiring an increased rate of return for new investments, or for investments in old plants which require additions, and my own experience and judgment agree with theirs.

In making one of the corrections in the development expense exhibits; "Plaintiff's Exhibit 198", Table 8, one of my assistants made a mistake in the computations. In the column under the tabulation, and headed with 7%, I asked you to change the item \$589,000 to \$687,000; that correction is all right. All of the corrections subsequent thereto are incorrect; in other words, if you will add to \$8,988,000 the corrected figure \$687,000, you will find that the old sum of \$9,675,000 was correct.

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CROSS EXAMINATION BY MR. SEARLS.

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Referring to Mr. Grunsky's report, I can see no additions for interest during construction. There seems to be a separate allowance for engineering and contingencies,—10%—but I see no specific reference to interest-during-construction as a separate allowance. Mr. Grunsky makes no specific mention of allowance for general administration in his report, beyond the general item of engineering and contingencies.

In speaking of the increased unit costs which would result in the construction of the system in a piece meal manner, I referred more particularly to the extensions in the distributing system which would enhance that cost. Where I would draw the line in laying the distributing pipe, in the number of feet, as to the increase in cost, would depend upon the pipe diameter. It is pretty hard to give limits, but I should say on the smaller sizes probably somewhere between 1,000 or 2,000 feet, although you would get still greater efficiency in operation, and consequently lower prices, if you were doing a very large amount of work, than a comparatively small amount of work, as half a mile of pipe, or something over 2,000 feet. I have known of many extensions made of 400, 500 or 600 feet—a block at a time, and there, of course, the burden of additional charge becomes very heavy, be-

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cause the cost of getting your gang, and your tools and supplies on to the work, and off again, becomes disproportionate to the amount of work done.

Referring to a table which Mr. Eddy and I prepared for Gillett's Hand Book, as respects the cost of laying pipe in Boston; that table shows, with respect to the length of pipe of different sizes that can be laid before the cost per unit ceases to decrease, that the difference is not very marked after you get 600 to 800 feet. There are some of them that show not much difference in the earlier years, 1886 to 1891, after you pass the 400-foot mark. You will notice that in the year 1902 the length is about 800 to 900 feet, and that in the year 1906 it is from 800 to 1,000 feet. The marked difference lies within the limit from 0 to 400 feet, and I call your attention, too, to the fact that this was nearly all 8-inch pipe; some 6 and 10-inch pipe is included, and a little 12-inch pipe. With 4 and 6-inch pipe the length involved, of course, would be greater, whereas with pipe of greater diameter, the length involved would be less.

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Questioned by Mr. Greene.

I mean this: In the case of pipe of large diameter, the cost per linear foot is much greater than with pipe of small diameter, therefore, the total cost of a certain short extension would be greater in the case of the large pipe than of the small pipe. The cost of getting the tool box and the tools on to the ground for doing that length of work would be about the same in either case, so that spread over the cost of the larger pipe, it would constitute a less increase or percentage increase over the average figures which result in the two cases.

Questioned by Master.

The deduction to be made is that the element of increase due to piece meal construction is very much more apparent in small pipe than in large pipe. Of course, the fact is also to be borne in mind that in doing a great deal of heavy construction you would get somewhat better figures. That fact would not be brought out in that diagram which I have given you, for the reason that that was predicated on a certain number of selected examples of work done in the city year by year, which examples were, in Mr. Jackson's opinion—he having been City Engineer of the city—strictly comparable; he was not able to get all of the records of cost, because the work varied so in character; he made use of the available comparable records. Therefore, I say I think the diagram cannot show the effect of difference in cost between the short extensions and the very large amount of work which would result from the greater efficiency resulting from having your gang working for a longer period of time, and well balanced and well organized, but that difference is smaller than the other effects shown by the diagram.

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CROSS EXAMINATION BY MR. SEARLS.

I should be disposed to agree with your statement that where the company has a well trained maintenance gang who makes these extensions from time to time, their efficiency would be greater than that of a construction crew employed for a short time, but I think this also is true, that if you were to take those same men now in the employ of the company, and organize your gang, and keep those men at a certain piece of work laying pipe for a certain period of months of the year, you would find your cost per foot for doing that work was substantially less than if it were done at different times during the year in smaller extensions; in other words, the machine does run more smoothly where it is running constantly on certain lines.

With any additions to your pumping stations, for instance, if you put in additional units, it would be more expensive, particularly the suction and discharging piping, connecting them up.

Mr. Sharon: In the case of Clarendon Heights, one unit was put in there in 1894, and in 1900 the second unit was installed; that meant the changing of the building, enlarging the building, and making changes in the suction and discharge piping, which were in addition to what it would have been if it were all installed at one time.

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The same thing happened at Belmont pumps. We had the two pumping stations there, which were installed in 1887 or 1888, and three pumps were added to the station in 1901. The same thing happened at the Black Point Pumping Station. One pump was installed in 1886, and the second one was installed in 1893. I think that is all of the pumping stations that were added to at different times.

The Upper Crystal Springs, San Andres and Pilareitos Dams were built in different units.

Mr. Metcalf: That usually involves additional expense. I am not talking about the valuation in this case; we neglected it in all of these cases. We assumed that the work would be built under the most ordinary advantageous conditions as a whole, and not under piece meal construction. Where you bind new earthwork on to old, it means you have to remove a considerable section of the old, and step it in order to prevent sliding of the embankment, and of course, you have to replace loam and the sod. Preparation of the skin of the new material always involves additional cost. The getting of your gang on to the ground, and off again, and getting it into efficient operation involves additional cost.

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Questioned by Mr. Searls.

That is a factor in original cost, and has actually increased the original cost over what it would have been if the structure had been built at one time, and it also tends to make the reproduction cost look very much lower, and nearer to the original cost than it would be if

the dam had originally been built, as figured on reconstruction, growing out of the fact that labor is dearer today than it was when the original structure was built.

10,573 I assumed that the whole of the Silva Tract—Exhibit 199— is in use for the right of way. I think there is but one pipe in there. Of course, I don't know the conditions under which that was originally bought; I assume that it was more advantageous for the company to buy the lot as a whole than to take a portion of it. An 800 or 900 foot right of way for a pipe line is wider than we would ordinarily buy, unless there was some such reason as that, or some consideration for future use for other purposes involved. It is my opinion that within reasonable limits it would be fairer to charge off a part of the valuation—if there was such a consideration—to other uses, and only charge the rate payers with a fair proportion of the value. There are a few such examples in these works where I think a portion of the property might have been sold off to lighten that burden.

10,574 I don't know that I can answer the question as to why I used Baldwin & Hoag's valuations for right of way properties, instead of Mr. Radle's, in as much as Mr. Radle valued it on a right of way basis. I told Mr. Sharon that we would take the average of all real estate experts' valuations, and whatever was missing we would find in the Radle estimate of rights of way, and we would use that. If the two overlap, I might have averaged them, I suppose; I don't know what the conditions are. It was my impression that Mr. Radle only valued in general the things that he did not value especially; there were a few cases where there was overlapping, and in those cases adjustment was made by Mr. Sharon.

Mr. Sharon: In looking through Radle's valuation, I found that he took a strip 25 or 50 feet wide, and valued it as right of way, whether it was on the company's property or not; if it was on the company's property, he did not include the entire company's property. I remember in one case I noticed that, particularly in the strip which the company owns from Newark to Dumbarton, about 200 feet wide; Radle valued only a 25-foot right of way upon that strip. Radle valued a right of way, as I remember it, in the Niles Canyon, but whether he did it in the case of the Silva Tract, I don't now remember.

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CROSS EXAMINATION BY MR. SEARLS.

Mr. Metcalf: I have looked up the past agricultural policy of the company only in general terms. I have not asked about all of the specific lots, because I am not familiar enough with the individual properties to feel that I could assist you very much. I do understand, however, that it is a fact that the higher priced properties in and about Sunol, and Pleasanton, have, as a matter of fact, been worked; they have continued the raising of crops upon those lands, and they

SPRING VALLEY WATER CO. VS. CITY AND COUNTY OF SAN FRANCISCO

have about Sunol made preparations for cultivation of a higher order in fruit culture than existed before they took the property. The other lands, I think, have been used for more general farming. I take it that the farmers of that region have not yet come to the intensified culture methods which are practiced in other sections of the State.

Of course, I don't know the details of the conditions on the various properties when they were bought. I suppose it is true, from a business point of view, that in order to do it successfully, the company would have to go into it in a very systematic way, and in a way which would involve substantial additional expenditure of capital in the early stages. Of course, I don't know whether the company was governed by the thought—in the case of the Calaveras—that if they went into operations of that sort, it might be claimed that they were running an agricultural business as well as a waterworks plant, or whether it was simply that they felt that the return which they would get from that sort of development would not justify the putting in of the additional capital.

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(Mr. Sharon called attention to the fact that in Exhibit 122 Mr. Radle does not include the Silva Tract as a right of way.)

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Mr. Metcalf: It is a very difficult question to answer as to when the Arroyo Valle and the San Antonio Reservoir dams will be constructed. I should not be surprised if one of them were built within a period of 10 years, perhaps. It all depends upon what develops in the relations of the company with the riparian owners further down on the stream. Also upon the attitude, assuming that the company continues to own the works—of the Railroad Commission, as to the taking on of business outside of the limits of San Francisco by the water company in supplying municipalities like Palo Alto or Redwood City, or any of the other communities like those with water, or any possible connections with Oakland, or other towns along the bay. All of those matters will become factors in that consideration. I think the construction of those dams under those circumstances, would aid in carrying the cost. I think it would be an advantage, and not a disadvantage to the rate-payers of San Francisco. The revenue would be increased under those circumstances so that the burden of the San Francisco rate payer would be less, and yet you might not be able to say that the reservoir was not of some utility so far as the city was concerned.

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I have been through the country adjacent to the Arroyo Valle Canyon, such as the Mocho and the Positas. There is not much of any development in the Arroyo Valle further up in the reservoir. Down at the lower end there is some development. There is not any great difference between the development in the upper reaches of the Mocho and the Positas and the Arroyo Valle. I think it may be that the land which is comparable in its topography and general character—in the adjacent canyons—with the land which the company owns in

10,579 the Arroyo Valle has not a development to date which is materially an increase over that that the company has made. I am not familiar enough with the situation to answer very positively, but that is my impression. In the country adjacent to the San Antonio Canyon, there are a few little farms scattered through the hills, and so far as I remember, there is no intensive development in that part of the country. Personally, I do not think that that being the case it would be a fair assumption that the company could today, or within the next few years, acquire the Arroyo Valle and the San Antonio properties if it did not own them at approximately the prices which have been placed upon them in this case by the real estate appraisers. I believe they would have been snapped up, either by water companies, or by men who recognize the growing need for water in this region, long before this time. If the company owned the dam site in each of these reservoirs, it would be in a strategic position to prevent that sort of action; I should feel a little safer if I were an officer of the company if I owned the reservoir site as well as the dam site.

10,580 The transactions of the company in the purchase of the Calaveras rights years ago indicate that even at that time there was recognition of the value of such sites for water producing purposes. The reason that the company went over to Alameda County in 1875 and made a purchase for a million dollars from the Alameda Water Co., and then sat back and did nothing further in the way of purchasing until along about 1888, I assume was because Mr. Schussler was far-sighted enough to see that the reservoirs on the Peninsula would not adequately take care of the growing demands of San Francisco, and he evidently felt that it was wiser to look in that direction than further south on the Peninsula, and that he bought those lands to prevent their getting into adverse hands, and the company be unable to acquire them at a later date. I think he must have felt that the Calaveras Dam was a key to that situation, that from it, or through it, the largest quantity of water could be produced at probably the smallest cost. I think the fact that the city was starting out to investigate some alternative sources of supply at the time may have been a factor.

10,581 Meeting your question of whether the rate-fixing bodies of the city would be subject to very much criticism if they were inclined to disapprove of an allowance of interest-during-construction from the years 1875 to 1914 on the prospecting that Mr. Schussler did on the Calaveras dam site, it does seem to me that it becomes a question of what is the ultimate cost of the water. If the carrying charges were not so heavy as to make final cost of the water unreasonably large, it seems to me that it is fair to include its carrying charges; if, on the other hand, the reverse were the case, I think you might well say then that it was not reasonable to allow the entire amount of those carrying charges. The condition is an unusual one. The water supply situation in this region is an unusual one. Carrying charges of a million

dollars for 40 years would amount to quite a considerable sum if they got nothing out of the purchase in the meantime.

With respect to the Pleasanton situation; if I find that the right to lower the water plane at Pleasanton has been valued, and for the purpose of this discussion assume that the valuation of that right was satisfactory to me, and that a value has been allowed for the right to divert all the water of Alameda Creek at Sunol, the question of what else is there to be valued that is of use to the Pleasanton District, besides the tract on which the well is situated, is a question of definition; if you mean to include the actual right to utilize the storage in the gravels of that valley, to draw down the water level, if need be, 50 or 100 feet below its natural level, so that it could not possibly overflow into the Sunol Creek, or if you include the right to lower the water to any extent the company may need in order to develop the storage in the gravels, and so conserve the water supply by utilization of that storage, and if you include further removing any cause for action against the company on the part of the other owners in the valley growing out of the exercise of that right, then I should answer your question, yes, that everything would be included in the ownership which you cite, but you must include in the question the assurance that the storage capacity of the gravels can be utilized by pumping the water level down as the company may find it necessary, and also the assurance that there may not remain cause for action on the part of the other owners in the valley. 10,582 10,583

If I owned a piece of land fronting on a running stream, I have under the law of riparian rights, a right to divert from that stream so much of the water as is reasonably necessary for my use on that piece of land, in conjunction with all the other owners on the stream. I cannot take all that water, I must share it with the others. One of the factors limiting the value of my water right in that case would be the dependable yield; also the adaptability of the land, and so on, would also be a factor in the value. If I could say there were 2 second feet of water running past my land all the year round, that would not necessarily entitle me to a valuation of 2 second feet if I could only use one of them. 10,584

It is not my understanding in the exercise of a riparian right that the land owner can take water and divert it beyond the watershed to non-riparian uses to the disadvantage of other users upon the stream; but the lower group of owners on the stream could divert any water that flows down upon them to other watersheds, and make use of that water, and having so used it, could acquire ownership in it, which would have value far in excess, perhaps, of what they could actually use upon their own land, and I understand that legally they would be entitled to do that. The reason that they could do that would be because their diversion would not in any way injure the owners of the lands above them; that is, the upper riparian

10,585 owner is physically able to divert his share of the water at any time,
10,586 and when the lower owner takes, it does not make the stream run
any faster, and it does not take any of his water away from him.

If I have valued the right to lower the water plane at Pleasanton to the extent that the company can lower it by virtue of its ownership of these Pleasanton lands, without causing injury and damage to the owners of those lands adjoining those on the east, I have not, as I see it, valued everything to which the company is entitled by virtue of its ownership of those lands.

10,587 It does not seem to me that your analogy is complete in putting the overlying land owners to the east of the Pleasanton land in the same category as the lower riparian owners because they are damaged by the taking by the Spring Valley Water Co. of more than their share of water from the Pleasanton lands; so far as the utilization of the natural flow through the valley is concerned, without the lowering of the ground water level, if I understand your question, I should agree with you, but so far as the utilization of the storage capacity in the gravels below those lands is concerned, I should not agree with you, and that seems to me a very important factor, because in the lowering of the water in storage in the gravels you were actually conserving water which would otherwise go to waste in the winter season and run off in storm water, and therefore putting to beneficial use water which previously was not available; in other words, it went off to the sea. I admit you do not control the entire right in that valley to these storage gravels, but you do control a part of them; say, for instance, for the sake of an example, that you owned three-quarters of them to make my point clear, you still do not own the whole valley, and yet you can exercise the right to lower the ground water level on those gravels, subject to the damages which you would pay to the remaining quarter of land, and the damages to that remaining quarter of the land would be far less than to the entire lands of the valley. Even though you had not paid that damage to the remaining quarter, I think that you are in a position where you are better off than you were before you owned the land, and you are in a position where the cost of developing the water will be less to you substantially than if you did not own the lands; it may well be that you do not own the complete right, and I take it that that is true, if you mean that the term ownership of the complete right means that you can take that water without any liability; nevertheless, you are in a position where your water is going to cost you less than if you did not own these lands.

10,588 The company, to the extent that it has taken the right, and
10,589 paid for it, it may cheapen the cost of the service, and is therefore a factor in the problem. I think the right to take water from a stream flowing past your land is very much more remote than is the right which you have acquired, and actually exercised to some de-

gree in the purchase of so large a tract of land as is here involved; it is not a small parcel. It is a very substantial area, and they have already pumped a substantial quantity of water; I assume that they have rights with respect to a certain limited quantity, but beyond that even the ownership of the lands gives them something which has an added value; just how much that is may be exceedingly difficult to compute, but I think it is real and tangible, and that it is an element. It is not my conception that the company could, without buying virtually the entire Livermore Valley, pump all of the water out of these gravels, without paying damage. The amount of the damages finally paid in the aggregate might be the best measure of the value of those rights, and the damages the company would have to pay for them might very well be five or six times the amount that they paid for the Pleasanton lands.

In other words, I take it that your point is that the company must be certain before it develops property of that sort that the aggregate cost of that sort of development will not exceed a reasonable cost as measured by other alternative sources. Of course, the actual cost of these rights, if the actual was small, might not measure fairly the actual value of the rights then acquired; that would depend upon market conditions as well elsewhere, but on the other hand, it might be a fair measure of the value. 10,590

I do not think that the property in the vicinity of Alameda County, in which the company holds property, is likely to appreciate in value on account of residential consideration as much as on the Peninsula. I think the Peninsula is one of the most attractive regions for residential purposes I have ever seen. I think it is true that the development along residential lines is likely to be much less in the Alameda system than in the Peninsula system, and I think that had the company not acquired certain lands which it did acquire, you would have seen a great deal of summer camping on those streams as you do now below the Sunol Dam during certain months of the summer. The region above Calaveras, for instance, is exceedingly attractive for that sort of thing, and it is accessible enough with a Ford automobile so that I think you would see many parties going up in there; the fishing is good, the views are beautiful, and the hills are very attractive. The same thing is true of portions of the Arroyo Valle. I do not personally think that it is safe to rely wholly upon policing to prevent pollution of the streams in that vicinity. Of course, that is advantageous, but to say that you can control a lot of campers in what they would do is contrary to my experience. I think you are safe, at all events, in keeping them off of the watersheds that are immediately tributary to your sources of supply. 10,591

Whether the ownership of anything more than a narrow strip adjacent to the stream would be necessary to protect the supply 10,592

from contamination is all a question of relative expense. The desirable thing, of course, is to own the entire drainage area from the watershed down to the point at which you take the water. Practically that usually becomes impossible where your watersheds are very large; then your ownership will depend upon the character of the stream, and the character of the uses to which it is put. Of course, you can do a great deal in the way of policing, but a time may come when it is cheaper to actually filter your water, rather than to go to the expense of owning the lands, and policing it, but even when you do filter, you take precautions to prevent the grosser forms of pollution.

In the case of the Arroyo Valle, where the water passes through the Livermore gravels before it reaches the point of diversion, the hazard of pollution is very much reduced. I think the Sunol gravels afford a very substantial measure of protection.

10,593 One method by which works can be run is to include a portion of the value of property comparable with the service it actually renders, and increase that proportion until you reach its full value, when full service is rendered, assuming that the proportion of property of that character is comparatively small; in other words, the ratio between it and the remainder of the property. Probably the most tangible and most satisfactory way of handling the problem would be to allow the original cost as soon as the property is taken. Taking the original cost as the measure of value rather than to take a portion of it. The question, of course, is a complex one, and is directly connected with the rate of return, and the price at which you can command money to do that work. Now, obviously, neither the Spring Valley Water Co., nor any other company would or could purchase lands and rights far in excess of the immediate needs, and carry them for long periods of time, if the rates are to be predicated upon the basis of permitting them to earn only on the property actively in use in the service of the public, with a rate of return, let us say, of 4% or 5%, provided the amount of the properties out of use is material, and I personally believe, regardless of whether it is material or not, when you say 6%, that even then it could not command the necessary money to do the work; at 7% I believe it could probably command the money necessary to do the work, provided the amount of the property which you are going to exclude from the rating base does not involve very substantial charges; in other words, substantially reduce the 7% rate of return. If the lands which you are carrying, which the company is planning to carry, would have the effect of reducing a 7% rate, let us say, to a net rate on the entire property which the company owns of 5%, the company could not do it; it would not do it as a matter of business, and it could not go on doing business on that basis.

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Therefore, I say that we cannot go very far in the elimination

of properties from the rating base which are reasonably necessary, in the reasonably near future for operation, without driving the company to a position where it will not make provision for the future in advance of the actual time of need. Now, if we drive corporations to that point, I believe we shall in effect actually increase the cost of the service, because in such a region as this, or in Colorado, for instance, as I have been familiar with the conditions, I believe it will mean that rights which the company will have to purchase will have been taken up for other uses, lower uses, as, for instance, for purposes of irrigation, and if the company then has to acquire water rights, or riparian lands, with their appurtenant rights, the corporation would have to pay not only their fair value, but the severance damages also, and as in the case of Denver, I believe that if the company had not anticipated the future conditions, it would have practically meant that the company, perhaps, within a period of ten years would have been obliged to have condemned the irrigation rights, and paid very heavy severance damages, or actually gone across the continental divide for water at a substantially increased cost.

I think it is a question of policy, and one of fact; I do not think the facts are controvertible that you can reduce a rate of return to a certain point; beyond that if you reduce them you would not be able to command money. I do not think that is a question of law; you simply would not be able to get money, and the next step would be either to take the plant, or else increase the rate of return.

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The primary consideration in acquiring the land at Pleasanton was by reason of the underlying water plane. As to why the rate payers shouldn't be charged with only a portion of the value or cost of such a property instead of the entire cost, because the utility for water purposes only affects its utility for agricultural purposes to a relatively small extent, is answered in this way: At least, as I view it, you would immediately get back to the question of its effect upon the actual rate of return which the company gets upon its property. While there is this further consideration, as I see it, however; while it is true that in my judgment, within a reasonable period of years, as soon as the rights have been acquired advantageously, the lands may be sold off, thereby reducing the total cost to the company of getting the rights necessary to develop this water, the cost will be greater in amount than the cost as of the date 1913; for instance, by whatever additional sums it may have to pay in the future from time to time, and more particularly at the present time, in the adjustment of the differences between the company and the owners of the valley. That aggregate amount may be less than what it has paid for the lands purchased, and to the extent which that is less I think it would be proper to take it into consideration in the rating base, with this proviso, however, that it may be reasonable in the

10,596 period of time while the lands are being carried, to consider the carrying charges upon these lands until they are sold.

10,597 Were the cost to be materially less ultimately of water, I should take that into consideration in charging the rate payer with a rate of return on the maximum investment, but the cost of actually carrying the investment which is necessary during that period of time must be considered as a factor in the rate of return during this period of years. I suppose the answer to the question, why would it not be just as logical to charge your consumer with the value of the water right until they demonstrated what the total amount of the investment was going to actually be, is that if you do your business in general on any such principle as that, capital would feel that the business was more hazardous, and would demand a higher rate of return. If you were buying very valuable agricultural properties which were sure to appreciate in value, and on which you could always be sure of earning a reasonable return, with proper development, perhaps that would not be true; I am assuming that the property has no other sources of revenue which would actually carry it. If the expenses are actually met on these Pleasanton lands, including the interest charges through the earnings of these lands, I have given you full credit for that in my analysis, because I have included in the actual receipts of the company, the actual revenue of the company, the income not only from water sold, but also from the lands of the company.

10,598 I have not taken into consideration that the company might have put the lands to a very higher type of use which would have afforded a higher return. I have taken the actual return as it has developed in the past period of years; there is a further consideration there, that the higher development which you suggest would involve very substantial additional expenditures, and if it might develop later that it is advantageous to sell some of these lands, it might be questionable whether it would be a desirable policy for the company to incur that additional expenditure, whether it would profit, in other words, by making such an expenditure. If it should prove more advantageous to sell the land it would be because the company could make more money that way, but what I meant was your implication that the company might have put the land to higher use; for instance, by making orchards upon the lands it would involve substantial capital expenditures, and in the end it might be that the company would fare better by simply carrying the lands for a limited period, using them for agricultural purposes, and then selling them.

It is my impression that in the Pleasanton holdings upon properties where farming operations had been carried on before, they are still carried on at the present time; I don't know that the company has developed lands, which at the time of purchase were not in use agriculturally.

I don't think that I can, specifically, give any process of reasoning by which I arrive at the figure of \$2,000,000 that I deduct from my gross reproduction cost in order to reach my fair rating base. I think that the Merced situation was the most important consideration, and the fact that on certain of the lands the areas might have been somewhat reduced; it being that way, I know they had weight.

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Questioned by Master.

It was a consideration of the conditions surrounding the operation as based upon the values of the real estate which I had assumed; as to Merced conditions, I think that I had in mind the fact that the variation in estimates, perhaps, was not so great there as on some of the other lands.

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Assuming that given all these factors that I have mentioned in the Merced situation, and other things, that instead of finding a valuation as I have summed it up, that you come out at a figure near my final figure, or below it, I would not still find my force effective to make a larger reduction than I did make. Starting with the valuation of the lands which were so reduced, I should probably make a smaller gross reduction than I have made. Of course, it is difficult to say, when you have considered a very complex property of this sort, from the various points of view that we have considered this, just what things have weighed most.

CROSS EXAMINATION BY MR. SEARLS.

The primary considerations which reduced this reduction were the situation at Merced and Pleasanton; you raised one this morning, Mr. Searls, where I think I should frankly concede that assuming that you could not get the Silva lot, or a strip 100 feet wide, for what I have allowed in the valuation, I mean to say that you could get it for substantially less, I should be disposed to say that a somewhat lower amount might fairly be taken, corresponding to what you could get a reasonable strip through that property for; the deduction which I made was addressed primarily to the land conditions as against the structural conditions. I feel pretty confident about the structural end of the property. I think there is nothing at issue in the lands within the city, and there is very little at issue on the lands on the Peninsula; the main issues are the Merced and Alameda systems. We are virtually agreed, so far as the structures are concerned, on the utility of those.

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I should say that in fixing the \$2,000,000 I had not made any substantial allowance in that for the development expense. On the other hand, if his Honor should rule that the assumptions which I have made with respect to interest-during-construction in structures are unfair and too high, then I should say that according to my theory, he ought to increase relatively the allowance for development expenses, the two being interdependent in that way. I would not

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accept the statement that the deduction of the \$2,000,000 was only induced by my consideration of the situation at Merced and Pleasanton; of course, that would have no direct bearing upon that \$2,000,000, except as you would have to give consideration to the effect upon the development expense; if he did not make any allowance there, I should make less deduction in the total amount; of course, he might not. Our minds might not meet on that. I reached that \$2,000,000 rather by consideration of—the biggest item being the Merced situation—that the \$6,500,000 for that was higher than the waterworks situation justified. That \$2,000,000 reduction will have to rest on my judgment. I did not make up any tabulation of the various parcels of property that might come into the consideration, and the amounts that might be involved. I considered it on broad lines.

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Questioned by Mr. Greene.

If Merced had been valued by the real estate people uniformly at \$500 an acre, that would have affected the treatment that I would have given, as far as deduction being deserved to be made from the real estate value; under those circumstances I should not have made as large a deduction as I have. In other words, it is the fact that there is such a very large element of value there, and that the amount of water is the amount that it is, that I have had in mind.

CROSS EXAMINATION BY MR. SEARLS.

It is not my concession that from the water standpoint Merced Lake furnishes anything like the same service that the Pleasanton lands do. It is quite a different service, because aside from the actual yield of about 3,500,000 gallons of water a day, the lake has tremendous value from the point of view of possible fire hazard, and interruption of other service such as occurred in 1906. The Pleasanton source is one of the regular sources of supply of the company, and of course, during this period up to the 3,500,000 gallons daily yield, Merced was a regular source of supply. I meant from the point of view of yield only; that is, 3,500,000 gallons a day, I think that I should have made further concession than I have on the basis of the present value of the Merced lands as testified to by our experts, that is, as being something in excess of \$6,500,000.

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Referring to Exhibit 197, Table 7; the source of my information for the gross and the net revenue earned in years prior to the 1906 fire were Mr. Reynolds' figures, and we had also the record of the dividends paid, and the coupon interest paid.

Mr. Sharon: We had from both Reynolds' and Wenzelberger's statements the different accounts which went to make up the operating expenses, but the accounts were not itemized in detail. We had that for each of the years since 1866.

Questioned by Mr. Searls.

Mr. Metcalf: Beyond the gross figures which they gave for each of the general accounting subdivisions I don't know what those expenses cover. I don't know positively whether all of them were proper operating charges, or whether there might not have been very large replacement charges, or possibly new construction which were paid out and charged to operating expenses. I do not think that the prevailing practice in the early days was to pay for a great deal of the original cost out of the operating expenses. In the early days the general evil was of swelling the construction account by putting operating expenses into it, not of swelling the operating account by putting construction charges into it. I think it is true that all replacements that were made were paid for out of the operations, unless it may be that there were some cases where there was a stock levy to take care of some abnormal condition. I don't remember any except that incident to the earthquake and fire conditions of 1906.

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Mr. Sharon: I do not know definitely except in looking through the operating accounts of both Wenzelberger and Reynolds there were years when the operating accounts were high as compared with a series of years, and I assume from that the excess cost for that year probably included some replacement, but just how much there was no way of determining.

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CROSS EXAMINATION BY MR. SEARLS.

Mr. Metcalf: So far as I know, there was no way to determine whether any of these portions of the plant which went out of use in early years, and were discarded, were not charged off to operation. Under the method of bookkeeping in vogue in those times, I do not think there would be any charging off on the books. They didn't have any depreciation reserve. The property simply went out of use, and that was all there was to it. It may be that their plant account would show a large number of items which did not exist at all. Of course, in our treatment of original costs we have made deduction for the accrued depreciation, and offset such a condition of affairs.

I don't know that I can give you just the theory on which this bookkeeping charge of \$260,000 was set up in the year 1908, except I understand that it followed the action of our courts, more particularly the action of the Supreme Court of the United States, in the Knoxville case.

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I think the financial condition of the Spring Valley Water Co. is sound. The stock is selling in the market in the neighborhood of a 3% basis today to investors, I don't remember the exact fraction, and that indicates that the investing public has confidence in the financial soundness of the company. I assume that the fact that so large a proportion of the company's assets is in real estate has some-

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10,611 thing to do with that. I think it is the assumption of the investor that if the company should sell its property to another utility, or to the City, they would get at least the appreciated value of the real estate. I think the business of supplying water for domestic purposes ought to be less hazardous than any of the public utilities, but I don't think it has been. It is my impression that the rate of return earned by water companies generally in this country has been substantially less than in telephone, electricity, and gas utilities; and from the negotiability of the securities waterworks stand in a less favored position than the electric project, or gas, or even the telephone, although the companies in the Middle West, and the Far West, have had far greater difficulties financially, I think, than on the Eastern seaboard. I think that has been largely due to conditions of competition.

10,612 I think the securities of water companies have been dealt in less in the market the country over than the securities of the other public utilities mentioned. I think one of the factors has been the element of uncertainty which has grown out of the possibility of the taking over of the properties by the municipality, and the doubts as to just how the security holders will come out in the interchange of the ownership. Of course, it is a fact that in the majority of cases the investors have realized the value of their property; in the East, where the majority of condemnations have taken place, the value placed upon the property has been in excess of the reproduction cost of the property, and much more substantially in excess of the original cost of the property, but it is a fact, on the other hand, that waterworks securities have not the ready market that the other securities have, and that one or two of the large dealers went by the wall some 15 or 20 years ago, which may have had something to do with it—and more recently the American Waterworks and Guaranty Co., in
10,613 Pittsburg, within the last 3 or 4 years; the memory of those failures may have had something to do with the lack of demand for waterworks securities as compared with the securities of other utilities as measured by the actual sale of securities.

In my study of the value of the company, based on the market price of its stock and bonds, I was struck by what seemed to be the fact that the Spring Valley securities had changed hands more frequently here than in other communities I have been familiar with. I have supposed that the ownership of the Spring Valley securities was very largely a local one.

10,614 Questioned by Mr. Greene.

When I stated that the intrinsic hazard of operation of telephone companies and power companies is greater than that of a water company, I was referring to the financial situation. The physical property of a telephone company is subject to a greater depreciation than that of a water company, particularly as to obsolescence.

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ence. If, on the other hand, you mean the hazard of interruption of service, I should say that the water company was quite as hazardous as the other.

Questioned by Mr. Searls.

If, for instance, there were interruption of service from one of the main supply lines supplying the city, so that the city was without water for a couple of weeks, I think irreparable damage would be done to the company in the attitude of the public toward it. The same thing would not be true if somebody blew up the main generating station of the gas company or electrical works, because to be without water is a pretty serious thing; with light you have substitutes which may be availed of. On the other hand, the hardship of being without the water service is very serious, and the danger which results in the possibility of fire hazard is also very serious. Those elements do not exist in the other public utilities. I should say that that both increased the hazard of the water business, and the hazard that the consumer undergoes, because the hazard of the consumer measures, in a way, his attitude toward the water company, and it would tend to make him hostile to the water company in a way that breeds trouble afterwards.

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With the exception of the 1906 disaster, there has been no other interruption of the Spring Valley service like that, so far as I know; it merely gives point to the fact which Mr. Hazen has already pointed out that you want a margin of safety in the operating units. Of course, from the point of view of the longevity, and the hazard of installation and so on, I am inclined to think that the gas and electric plants are more hazardous than the water plant, and of course, it is a fact that they command higher rates for money. They have to have higher rates to borrow money for those enterprises.

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The business of supplying water is a natural monopoly, and competition in the water business is very much less of a factor than in any other of the utilities, except, possibly, the telephone, and although I personally think that the telephone should be a monopoly just as much as a water supply, because you do not get the best of service with two telephone companies in the field.

Witness: W. A. BOSTON for Defendants.

Boston

DIRECT EXAMINATION BY MR. SEARLS.

I reside in San Francisco, and am 60 years of age. I am a public accountant, and have been practicing for myself for about 4 years. Prior to that time I was with Smith, Tevis & Hanford, Inc., in the investment bond business. Before that I was accountant and cashier for the Savings & Loan Bank for about 30 years. That bank was absorbed by the Savings Union Bank & Trust Co. In the course of my employment I became familiar with the stock and bond market

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in San Francisco. With Smith, Tevis & Hanford I handled many millions in bonds, and sold the bonds of subsidiaries of the United Properties Co., the San Francisco, Oakland & San Jose Ry., and also the United Light & Power notes, and also bonds issued by municipalities in this state, and with the bank we always had a large number of bonds on hand, from \$3,000,000 to \$5,000,000. During that time I bought and sold a great many bonds. It was my business and duty to examine into the bonds as to their marketability, cost and yield. Since that time I also have taken great interest in the price of securities here, and prices on the San Francisco Stock and Bond Exchange.

10,618 I prepared a tabulation showing the sales of stocks and bonds of various corporations whose securities were listed on the San Francisco Exchange from the years 1907 to 1914, inclusive. The table is marked "Rate of return". The information contained in this table was obtained from the official monthly report of the San Francisco Stock and Bond Exchange. The material on page 3, which contains a list of the municipal bonds sold by the City and County of San Francisco, was obtained from Mr. H. A. Mason, the Clerk of the Finance Committee of the Board of Supervisors. The figures shown in this table correctly represent the market prices on a monthly basis, at which these securities were bought and sold during the period under discussion. These figures were made up from the highest and the lowest prices, and an average taken of that price monthly, and then those prices were averaged.

10,619 On page 32 is the average net return on stocks listed and sold on the San Francisco Stock & Bond Exchange for the year 1911. In the first column are the names of the company which issued the stock, the next column the par value, and the next the number of shares sold, and the next the average price obtained by taking the highest and lowest prices, and getting the average for the month, and then multiplying the number of shares by that average price. This is the price for the year. The monthly average is made up, taking the highest and lowest, and taking the average price, and then multiplying the number of shares sold for that capitalization.

10,620 In the first case it would be the Marin County Water Co., 20 shares sold, the average price for that year was 55; the next column is the dividend, that is the percentage on the shares sold—the capital. The next is the rate of interest, or yield of the dividend at 3%, and then the last column is the basis obtained by multiplying the value of the shares by the net rate which gives the basis. Column 4, headed "Average price", is the yearly average, obtained by taking the highest price and the lowest price each month, and taking an average of that for each month.

I have only included stocks which paid a regular dividend, and which you might say are of a high grade. I have not included any

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stocks that have any great speculative element, like the sugar stocks, or certain industrial stocks, but have included the water, and lighting, and banks, commercial and savings, some oil stocks, and some industrials, and telephone stock.

Questioned by Master.

I consider the oil stocks less speculative than the sugar stock. Sugar stocks have varied as much as 100 or 200 percent in two or three years; Paauihau sold a couple of years ago at \$10, and is now selling for about \$29.50; Hutchinson was down to about the same figure, and now is selling at \$30. The sugar stocks depend a great deal on weather conditions like all agricultural products, and I consider them extra hazardous.

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DIRECT EXAMINATION BY MR. SEARLS.

At the bottom of this sheet I have shown average weighted net rate of return, both inclusive and exclusive for each year of the Spring Valley stock. On the fourth page will be a summary for the average net return on stocks for the years 1907 to 1914, inclusive. I have again obtained the weighted average for the entire period, inclusive, and exclusive of Spring Valley stock. The Spring Valley stocks were selling on a basis in the year 1908 of 3.87%; in 1909, 5.61%; in 1910, 4.18%; 1911, 3.6%; 1912, 3.17%; 1913, 3.77%; 1914, 4.53%, on a monthly average.

My opinion is that the investors and purchasers of Spring Valley stock have in mind the probability of the property being sold, and that they are willing to pay a comparatively low rate of interest on their investment in the hope of getting an increased price for their stock, and to that extent there is a speculative element in it.

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Questioned by Master.

I mean by that the possibility of sale either to the City, or to another public utility company. I have never heard of any suggestion of sale to another public utility company. What I have in mind is the possibility of some one of these numerous sales to the city that have been discussed in years past going through with a chance of profit.

Questioned by Mr. Searls.

I think the fact that most of the assets of the Spring Valley Water Co. are in land has an effect on investors, and that is irrespective of whether the sale in question took place or not, there would be an appreciation in realty value.

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Taking page 15, which contains the bond sales for the year 1911, it was made up pretty much in the same way as the stock sheet. I took the official report of the stock and bond exchange, and eliminated some bonds in which there were very few transactions in this period, and also bonds that were not proven, or that the corporations had occasion for reorganization, or had gone into the hands of receivers. The table

is made up by giving the name of the company issuing the bonds, the rate of interest on the bonds, the sales, par value, and the average rate, and the net interest rate.

Questioned by Mr. Greene.

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The net interest rate is the rate of interest on the amount paid for the bonds running to maturity, and then the basis was obtained by multiplying the sales par value by the net interest rate. If the bond, taking the San Francisco, Oakland & San Jose Railroad, second mortgage was 92.48 at that date, it was calculated up to maturity of that mortgage, and the net rate is the yield at that average rate.

DIRECT EXAMINATION BY MR. SEARLS.

The 4% bonds of the Spring Valley Water Co. sold on the market in 1907 on the basis of 5.07%; 1908 at 5.62%; 1909 at 5.05%; 1910 at 4.95%; 1911 at 4.06%; 1912 at 4.62%; 1913 at 5%; 1914 at 5%; that is the basis on the selling price, on the market price.

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On pages 1 and 2 I have shown the averages and totals for the years in litigation of the bond sales. On page 2 I show the corporation bonds alone; a summary for the period from 1907 to 1914, inclusive, which shows the average net rate of return to be 5.06%, inclusive of Spring Valley. Exclusive of Spring Valley in that period from 1907 to 1914 the average net return is 5.07% net rate. On page 3 I have shown the municipal bond sales from 1908 to 1914, inclusive, and those calculations include consideration of maturity. The net interest rate is the net rate on the bonds issued and sold by the City and County of San Francisco, and based to extend to maturity.

Questioned by Master.

I obtained it all through from a standard discount table; those of the City of San Francisco were given to me by Mr. H. A. Mason, the bond expert. He gave me the net interest rate; the others are all calculated on the tables of Montgomery & Rollins, the tables that are used by all the bond houses and banks.

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Questioned by Mr. Searls.

The table on page 1 shows the weighted average rate on both stocks and bonds, figured inclusive of, and exclusive of the Spring Valley securities.

(Rate of return, William A. Boston, introduced and marked "Defendants' Exhibit 209".)

Questioned by Mr. Metcalf.

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Mr. Boston: By the word "basis", which is used in this last column in a number of cases, I mean the product of the number of sales times interest rate; the shares are reduced with the par value, multiplied by the interest rates, giving the base; that, divided by the quantity, of course, would equal the percentage, giving the weighted average on the base. It is reckoned on the par value. My rate of

interest is based upon the selling price, that is, on the dividends. Now, if the dividend is $2\frac{1}{2}\%$ on par, and it is selling for 55.18, then that dividend is equal to 4.53% on the selling price. On that basis I mean the product of the shares sold times the interest rates. I simply use that as a means of getting the average of what we call the weighted average rate, weighing it on the number of shares sold, instead of on the value.

Questioned by Mr. Greene.

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This does not take into account in any sense the cost of the issuance of those bonds to the corporation. I do not intend to be understood here as stating that this table shows what money cost these various companies.

Witness: WALTER D. O'BRIEN for Defendants.

O'Brien

DIRECT EXAMINATION BY MR. SEARLS.

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I live in Piedmont, California, and am 36 years of age. I am a salesman for the Mount Diablo Villa Home Association, which is one of the R. N. Burgess corporations. During the years 1907 to 1914 I was engaged in the general stock and bond business, and in the mortgage business for myself. I had a partner by the name of Clark, and we were operating under the firm of Clark & O'Brien. Then I was sales manager for the Western Mortgage & Guaranty Co. during its organization, and also sales manager for the Agricultural Credit Co. during its organization. During the course of my business I had occasion to become familiar with the principal loans that were made on mortgage security based on city real estate during those years. I acquired that familiarity from engaging in the mortgage business, the handling of mortgages as a broker. In my business I followed the principal mortgages that were made at that time, and they are matters of public record in the city.

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The first page of the table which I have before me is a table showing deposits in San Francisco savings banks, drawing $3\frac{1}{2}\%$ and 4% interest during the years from 1907 to 1914. That was obtained from the San Francisco Real Estate Circular, issued monthly, which is a publication which has been issued since 1866 by Thomas Magee & Sons. It is compiled from the records issued each day, and they show the number of mortgages as they are issued, and they compile a complete record of all the mortgages issued.

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(Objection was made to the page showing deposits in savings banks as being purely hearsay, and the objection was sustained.)

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(The same objection was made to page 2, showing the total number and amounts of mortgages, and deeds of trust, recorded on San Francisco real estate from 1907 to 1914 by banks and institutions, and the rates of interest. The objection was sustained.)

10,633 Mr. O'Brien: Referring to page 3, showing a number of mortgage loans in large amounts, together with the parties, the amounts, the rates, and the location of the property; that information was obtained through mortgages that I negotiated myself, and from an examination of the records as they appeared in the City Recorder's office of the City and County of San Francisco. The one I negotiated myself was the 1910 mortgage from the Cogswell Polytechnic College to Hyman Bros., and to the Holmes Estate. The two in which I was interested myself are simply these two as they appear on this list.

Questioned by Mr. Greene.

10634 I know the circumstances under which that loan was made, and
10,637 there were no peculiar circumstances affecting it. As to the others, they simply represent a record which you would find if you went to the Recorder's Office, showing the amount of the loan, and the nominal rate included in the mortgage or deed of trust, as the case may be, and that the location is in general what I have given under the column "location". As far as these loans are concerned, I know nothing at all about the circumstances attending them, except that I was generally engaged in the business at that time, and was familiar with all loans that were made during these years. I do not know about all of them, but quite a number of these I knew of personally at the time that they were made.

(The last two pages only of "Rate of return, W. D. O'Brien", introduced and marked "Defendants' Exhibit 210".)

Mr. Metcalf: May I say for the record that Mr. Sharon and I glanced through Mr. Grunsky's report, and we have not found allusion to the interest-during-construction allowance.

ONE HUNDRED AND FORTY-FIFTH HEARING.

APRIL 26, 1916.

Witnesses: E. A. BAYLEY for Defendants.
M. M. O'SHAUGHNESSY for Defendants.

Bayley

Witness: E. A. BAYLEY for Defendants.

10,638

DIRECT EXAMINATION BY MR. SEARLS.

I reside in Los Angeles, am 38 years of age, and am a civil engineer by occupation. I am employed by the Los Angeles Public Service Commission as assistant engineer, and I was locating engineer on the aqueduct for a period of about 5 years. I was on the actual location surveys for the conduits and tunnels, and syphons as con-

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 structured. I made a survey for the property line of the Haiwee Dam on the Aqueduct. I made a survey for the Ana Verdi Reservoir site, which has since been eliminated from the aqueduct situation. I made a survey of the boundary and property line of the Dry Canyon Reservoir. For the Board of Public Service Commissioners I made a survey of the boundary and property line of the two Fernando Reservoirs. I made a topographic survey for the two Franklin Reservoirs. I made a topographic survey for a proposed reservoir in the Inglewood Hills, known as the Centinella Reservoir; it is a site at the present time only. I made surveys and examinations of a good many possible sites in and about Los Angeles, but they were not available or feasible.

Questioned by Master.

All reservoir sites that are available have been utilized, except this one in the Inglewood Hills, which is a proposed site, and a site called the Chatsworth Reservoir site, which we expect to utilize, but which has not been acquired by the city yet. That site is not available for domestic water supply, but it is available for irrigation purposes. It is in the upper end of the valley, but down in the trough of the valley.

DIRECT EXAMINATION BY MR. SEARLS.

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 The reason for making the surveys for alternative locations was that we needed more storage. The City of Los Angeles has not quite enough storage to put its aqueduct in full commission; that is, to full capacity throughout the year, and we needed more storage, and we are still looking for storage. The Centinella Reservoir site is owned mostly by the Los Angeles Investment Co., which is in bad shape, and there has been no arrangement with them to purchase, although as soon as they are in shape, I think the city will try to purchase that site. I am not personally acquainted with the condition of the title. The property is in litigation.

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 The City of Los Angeles has acquired all of the available reservoir sites within a radius of 50 miles of the city for domestic storage. I might qualify that, possibly, by saying that west of the Franklin site, and between there and the ocean, is a site known as the Benedict Reservoir site. We made a survey of it, but it was abandoned by Mr. Mulholland as being too far to the west for the use of Los Angeles.

CROSS EXAMINATION BY MR. MCCUTCHEEN.

As I take it, the storage reservoir takes care of the annual change in water consumption, while a regulating reservoir takes care of the daily fluctuations, the hourly fluctuations, and possibly during a hot spell for a week or two. The capacity of the largest reservoir I have spoken of, which is the Chatsworth site, which is not purchased, is 25,000 acre feet. On the Upper Fernando we have the site, but have

not constructed the dams or the reservoir; the capacity is about 15,000 acre feet. The lower one is 23,000 acre feet.

10,642 I am reading from a paper memorandum taken from our records and our surveys, as made by the Water Department of the City of Los Angeles. I simply copied it off our memoranda for quick reference. This record I made myself by copying it off our topographic maps and our records. The maps and the records were made by the Water Department of the City of Los Angeles. I had to do with the making of the maps and records on both of the Franklin Reservoir sites. I computed the information on the Fernando and the Centinella sites; the others were made by the Department, but not by me personally. I was in charge of the actual making of the maps of some of the sites. That is to say, the maps were made by draughtsmen under my orders; some of the others were made by me as field engineer in the field. The only memorandum I have quoted from right now is of the two Fernando sites. I got that information from our official records in the Water Department in the City of Los Angeles. I did not have anything to do with the preparation of those records as a draughtsman, but I made part of the surveys of the two Fernando Reservoirs. Those are the records made and approved by Mr. Mulholland, and I had nothing to do with them, or with the gathering of information on which they were made, except as assistant engineer, as I am under Mr. Mulholland. I am the only assistant engineer in the Water Department, and I was the assistant engineer at the time those records were made, and I am still the assistant engineer.

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10,644 I made the actual field surveys for the two Franklin Canyon Reservoirs. I determined the capacity personally by the regular method of determining capacity, from contour maps. The capacity of the larger of those two reservoirs is 1100 acre feet. A reservoir site can be made anywhere to any amount; it is just a matter of dollars and cents. When I spoke of reservoirs within 50 miles of Los Angeles, I meant feasible, practical reservoir sites. The Franklin site is feasible and reasonable because it is of proper elevation, is of a sufficiently large storage capacity, and is close to Los Angeles; it is in the direction in which Los Angeles is growing, and will, in time, become more or less towards the center of the city.

Those are not storage reservoirs in the light that your storage reservoirs here are in size, but they are storage reservoirs for use. The Franklin Reservoir will take several weeks' supply, and we call it a storage reservoir; the upper one we call a regulating reservoir. The first one is ten miles from Los Angeles, and the other one two miles further.

It is not my impression that you cannot find within 50 miles of Los Angeles unused sites which are equally as available as those two from every standpoint, if you take it from the standpoint of the op-

posite direction of the aqueduct. We could go east. We would find a site around Pomona, but it would not be practical, because it would not be in the line of the aqueduct. The aqueduct is the only additional supply which we have other than the Los Angeles River supply.

The waters from the aqueduct direct are turned into the two Franklin Reservoirs. It is my understanding that in the line of the aqueduct—not a 50-mile radius—that there are not two sites yet availed of that would be equally available with these two Franklin Canyon Reservoirs. There are no feasible sites at the present time that we could utilize along the aqueduct within 50 miles of Los Angeles that are as good as these two Franklin sites. The aqueduct is constructed, and we would have to go out of our way if there was a site. I know of none, personally, taking the aqueduct as it is constructed today, and in that route I don't know of any we could use without great expense other than what we have. If we were in the mountains, I would say it would be within a mile, perhaps, and when we come down in the San Fernando Valley, I would take the whole valley in making that answer. To my knowledge I know of no sites within 50 miles of Los Angeles along the aqueduct, and within a mile of it, equally available as the others. I know the situation, because I have been over it very thoroughly.

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The two Franklin sites were available for reservoir purposes because they were in a direct line from the original end of the aqueduct, which is in the San Fernando Valley, and within the City of Los Angeles. They were ordinary canyons in the hills, but they were better canyons than other canyons adjacent on either side. There are not dozens of canyons similar to those two along the aqueduct equally available for reservoir purposes. The slopes are steeper. They have not the capacity for the size of the dam that might be placed in them. There are a number of canyons we could put a dam in, but we would get no storage at all. The gradients of the canyons are steep. For a reservoir site we would need a canyon broad in area, and narrow at the neck, to make a natural dam site. Dams could be constructed just the reverse way, but they are not practical or feasible. In a sense, I mean that the cost per million gallons would be too great in other cases with the cost of the two Franklin Reservoirs, except in the case of the Fernando Reservoirs. In the Fernando Reservoirs there were storage sites, but our cost per million gallons in those two reservoirs is more, perhaps, than in a reservoir in the vicinity of San Francisco, such as you have here.

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By an available site I would mean a site of sufficient area and capacity, and in a proper location for a dam. Along the aqueduct, the only site I know is the Ana Verdi site, some 12 miles away, and after we got the water there, we could not make any use of it with-

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out another aqueduct, or an aqueduct extension. The investigation with reference to the availability of these sites was under Mr. Mulholland. He has the only charge there. He has delegated certain charges to me, among them being the location of reservoir sites. He has instructed me on certain occasions to examine sites, not necessarily to make surveys. I made a tentative location for a site near Pomona—Walnut Creek. That was not availed of, and had no connection with the City of Los Angeles.

I was ordered by Mr. Mulholland to go out and make a location of a particular site; that is, he had selected it, and he instructed me to go and get certain information regarding the sites he had selected. I picked out one or two sites myself, and took Mr. Mulholland over them, but they were not adopted. I never selected one that was adopted.

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When I speak of the availability of a reservoir site, one of the features that I take into consideration is the cost per million gallons of storage. I was concerned with the cost per million gallons of storage for these reservoirs that I have mentioned, because I was more or less office engineer for the Water Department. Mr. Mulholland told me to determine what the cost of storage per million gallons in a given reservoir site would be if it were converted into a reservoir, in terms of acre feet, we do not use per million gallons. An acre foot is 324,000 gallons, and you approximately divide your acre feet by 3 to get million gallons.

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I will explain what Mr. Mulholland told me with reference to the ascertainment of the cost of storage by taking the Franklin site; Mr. Mulholland told me to project several locations for dams in the canyon, and pick out which was the best from the point of yards per acre feet, which would be cost per acre feet, because one is a function of the other. I picked out both locations for dams, and made estimates on the cost per acre foot. I also did it on the Centinella, and on the Chatsworth site, and reported the figures to him. Mr. Mulholland did not, in every case, locate the place where the dam in each of the Franklin Canyons was to be located, but in a general way, he did. Mr. Mulholland indicated the particular sites for the two Franklin Canyon Dams, but the actual detail, whether to put it a few feet to the right or to the left, or even 50 or 100 feet, he left to me. The general site Mr. Mulholland selected.

I made an effort to determine the relative cost of storage in these Franklin Canyon Reservoirs as compared with the cost of storage in other sites along the line of the aqueduct which are not yet availed of, in this way: In order to determine the proper height of the dams, and the proper combination of sites, I made a determination in the Centinella relative to the Franklin, as to what height the dams in each should be, so that the total storage combined was the maximum of the

yardage we would put in. In that we did not consider relative costs, we were obtaining the minimum total costs. Mr. Mulholland, in every case, designed the dam so far as the cross-section was concerned, but so far as the detail drawings and the detail planning was concerned, I had to do with it. Mr. Mulholland has a standard type of earth dam which he builds in every instance; that is, 20 feet at top, and $2\frac{1}{2}$ to 1 slopes both ways. That is the standard type we build in every case, except in the Lower Franklin, where part of it was put on a 3 to 1 slope.

I have examined the maps issued by the Coast and Geodetic Survey, but they do not extend along the aqueduct. The United States Geological Surveys did not extend along the aqueduct when it was located, but do now, and I have examined those maps very carefully. They disclose the Benedict Reservoir site, but on an examination and partial survey we did not think it was feasible; it was too far away, and out of the line. It was two or three miles further west than the Franklin Reservoir, and there was no natural inlet into Los Angeles. Those maps also disclosed a small canyon in Hollywood, and we made a partial survey of it several years ago, but nothing was done about it at all. This would be within the city limits of Los Angeles. I will say this: There was a very poor site below the two Fernando Reservoirs, and we made only just a superficial survey of the outline of it, and it was thrown out. This site is now in Los Angeles.

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There are five reservoir sites available in connection with the aqueduct system within 30 miles of Los Angeles, and on the north and east sides of the city; that is to say, five that have been constructed, and are to be constructed. They are poor reservoirs. These are all to the north, not to the east at all, and are right along the aqueduct. I know of no reservoirs that would be equally as good as these five I have referred to. There is one, but it could not come under the aqueduct; it is in Pasadena—the north end of Altadena. I don't know its capacity, and I never made any survey of it. As I understand it, the dam-site is very poor; the rock is porous. The reservoir site is good. It would be an exaggeration to say that within 30 miles of First and Spring Streets, and to the north and east of the city, there are 100 sites equally available with these five that I have referred to. They are placing about 100 reservoirs to the square mile all through the mountains for flood control purposes; their plan on that, though, is part of their system of flood control, and they are just little ponds. I know we could not find 100 sites within 30 miles of First and Spring Streets, and to the north and east of Los Angeles, equally available for reservoir purposes as the five I have referred to. I have not investigated as to 100 sites; I have only made investigation as to what we might be interested in, which we could utilize. It would not be fair to say that I have no knowledge or information about lands available for

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reservoir sites, except immediately along the aqueduct, because I have lived in Los Angeles 30 years, and I have been all over that territory, and know the topography well.

The five reservoir sites that I described as not very good are the Upper Fernando Reservoir site, the Lower Fernando Reservoir site, the Upper Franklin Reservoir site, the Lower Franklin Reservoir site, and the Centinella Reservoir site. I would say they were poor reservoirs.

10,655 I could not give the exact amount of time that I have devoted to ascertaining whether there are within 30 miles of First and Spring Streets, and to the north and east of the city, other reservoir sites as good as these five that I have mentioned, but it has been in the last four years I have observed the territory possibly with the idea of reservoir sites in mind all the time. To ascertain that I visited the Walnut Creek site; one at Devils Gate; I have visited another one midway between the Franklin Reservoir site and the Chatsworth Reservoir site. In fact, I took Mr. Mulholland out, but he said it was not any good. I examined the low hills between the Chatsworth and the Fernando Reservoirs. I examined the mouth of the Tejunja Canyon. I examined the Arroyo Seco, and a number of the canyons between the ocean and Los Angeles and the Santa Monica Hills.

10,656 I made no report with reference to the existence of reservoir sites within 30 miles of First and Spring Streets, and to the north and east of the City of Los Angeles, because I found no sites. I looked for them of my own accord a number of times during the last four years. Mr. Mulholland did not tell me to look for reservoir sites within 30 miles of First and Spring Streets, and to the north and east of the city, because he is familiar with the topography, and he knows there are none that he would want to use, or could use. I mean to say, to the best of my knowledge, he knows there are none, although I could not testify to what Mr. Mulholland knows. I know of no site, personally, within 30 miles of that point as to the north and east of the city, comparable to those five that I have mentioned that can be used. I will say there are no sites fairly comparable to any one of the five. In talking with reference to the aqueduct, there might be a possibility of sites, for instance, right in the business center of the town, but the cost would be clear out of the question, and along in the hills in Hollywood, right down in the residential section. We simply would not look there, because it would be out of the question to purchase the land. The territory is pretty well built up all over the country within 30 miles of First and Spring Streets. There are a number of unoccupied canyons within 30 miles of that point, but I know of no site available or comparable with the ones I have mentioned; that is, comparable from the standpoint of cost, capacity, elevation, and location as to the distribution pipes.

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I have not made any investigation for the purpose of determining the cost of constructing a reservoir at any of the places or points other than those I have mentioned. I have taken several trips purposely, of my own accord, to sites that I thought were possible sites. I took a trip out to Walnut Creek, which lies between Glendale and Pomona. I took a number of trips up in the Devils Gate on the Arroyo Seco, which is north or east of Los Angeles.

When I used the word "possible", in speaking of these other sites, I meant that from an examination of topographic maps, there appears from the arrangement of the contours to be the possibility of a site; physical examination on the ground shows that those may or may not be sites. Contour maps are more or less accurate, but you cannot take them as absolutely accurate; you have to make a personal examination. Leaving the location of the aqueduct out of the question would make a difference as to availability; the location of the aqueduct I would always have in view, because we would have no water to put in these reservoirs if they did not come within the radius of the aqueduct. There would be two storage reservoirs, one at Devils Gate, and one at Walnut Creek, within 30 miles of Los Angeles and north and east of the city, that would be available for reservoirs if we had the water with which to fill them. I believe there is a possible site about ten miles east of Los Angeles, but at a low elevation; it is a site that was possible years ago, but it is now built up. It could not be used in connection with the city system. I know of no more sites than those three within 30 miles that would be available if they had the water with which to fill the reservoirs as good as the two Franklin Canyon Reservoirs. In order to determine exactly how many there were, a person would have to make a complete and thorough examination of the territory within the 30-mile range, and that is what I have not done, and nobody else has done it, other than an examination of topographic maps.

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The site at Devils Gate and the one at Walnut Creek would be storage reservoirs. They are not built, and have no connection with the Aqueduct. I know that the Aqueduct plan contemplates the construction of a very large storage reservoir above any of these that I have spoken of. It contemplates the construction of the Upper Fernando Reservoir, and that is above the one I have spoken of. The Aqueduct does contemplate in the Owens River Valley one or two more large reservoirs, and the reservoirs further down will be distributing reservoirs and storage reservoirs over part of the year.

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RE-DIRECT EXAMINATION BY MR. SEARLS.

All the reservoirs that I have mentioned deliver water by gravity, and at the present time you do not have to pump the water from any one of them. I think the total storage available from those sites that I have mentioned, is in the neighborhood of 70,000 or 80,000 acre feet.

RE-CROSS EXAMINATION BY MR. MCCUTCHEN.

I mean sites that have actually been converted into reservoirs, and that we intend to convert in the near future.

Questioned by Mr. Searls.

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The total storage is 65,500 acre feet, leaving out the Dry Canyon, and that would be about 22,000,000,000 gallons.

Questioned by Mr. McCutchen.

All these reservoirs mentioned will be distributing reservoirs in connection with the aqueduct system. They will serve both storage and distributing. I would call the larger reservoirs storage reservoirs, and the small Upper Franklin a regulating reservoir. You can do some little distribution from it. The Lower Franklin we will distribute from. They are all storage reservoirs to the amount they store. The two Fernando Reservoirs, 15,000 and 23,000 acre feet capacity, respectively, I would call storage reservoirs. The Fernando Reservoir I would call a semi-storage reservoir; we store, and we can distribute from it for a short period. It is 1100 acre feet. Taking the two Franklin Reservoirs, and the Centinella, and taking into consideration the normal draught, the supply would last just a few hours if you did not continue to turn water into it. Taking the two Fernandos, and the Chatsworth, the supply could last 7 or 8 months. The Chatsworth Reservoir is an irrigation storage reservoir, and not a domestic reservoir. At the present time they are all storage reservoirs, except the Lower Franklin, which distributes straight into the city mains.

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Here is the explanation of it: We need 85,000 or 90,000 acre feet capacity to put the aqueduct to its fullest use; that is, that 400 second feet may flow through the aqueduct every day in the year; in order to put it to that use we need some 80,000 or 90,000 acre feet of storage to tide us over the summer season of 8 months, our irrigation season, and the season when we have the heaviest draught on the domestic system. Regardless of whether you call it storage or distributing reservoirs, if we have that capacity, we will be taken care of. The small reservoirs are regulating; they are kept full as long as possible; there comes a time, perhaps, at the end of the summer season, when they will be low. When I say "those reservoirs", I have in mind, in this case, the reservoirs I have been speaking about.

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FURTHER RE-DIRECT EXAMINATION BY MR. SEARLS.

This is the only storage that is available to the Aqueduct at or near the Los Angeles line of the conduit. We could not use storage beyond the mouth of the Aqueduct; that is, it would have to be between that and the City of Los Angeles, or we would have to have a larger capacity aqueduct during the time we were withdrawing from the storage for an additional conduit. The Dry Canyon Reser-

voir is a regulating reservoir for power purposes; it has some storage which could be utilized in case of a break on the Aqueduct above that site.

Witness: M. M. O'SHAUGHNESSY for Defendants.

O'Shaughnessy

CROSS EXAMINATION BY MR. MCCUTCHEN.

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My familiarity with the Spring Valley properties began in 1885 with the tunnel at the end of Folsom Street, through Bernal Hill. I didn't have anything to do with them, except to visit the properties and see it at that time. The next time that my attention was called to the property was in 1888, when the Crystal Springs Dam was being built, and I went there just as a matter of engineering interest. The next time was in 1890, in the northern portion of the Lake Merced property. I was employed to get up plans for a racetrack on those properties, and did make plans for them; the track was going to be built just south of the present Sloat Boulevard. Arrangements were made to lease the property from the Water Company, and negotiations were conducted for over two months. They terminated because of the restrictions the Company at that time imposed. I went over the property pretty well at that time, and since then I have been practicing my profession in San Francisco, and have kept in active touch with that property more or less, and that continued up to the time I assumed the office of City Engineer. I have been in very intimate touch with the property since that time.

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I first became familiar with the transbay properties of the Company in 1888. I was employed by the Pacific Improvement Co. to lay out the town of Niles, and the Spring Valley was then conducting operations up the Niles Canyon. I went up and explored the work being done at that time. I went in my own individual capacity, just to explore and see what was being done. I concerned myself with its construction operations, that is all, and I learned at, or about that time, that the Company was conveying water from that side of the bay to this side of the bay. This work that I went over to inspect was the restoring of the old aqueduct from the Vallejo Mills intake at the old dam-site. I learned at that time the sources from which the Company was getting its water which was being conveyed from that side of the bay to this.

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In 1893 I made investigations in Pleasanton Valley for the owners of the intended Hop Ranch, and made drainage surveys for them before they completed the canals for drainage there. The land then belonged to the Black Estate, and had just been taken over by Lilienthal, for whom I did the work. There was constructed a drainage canal, starting at County Road 2000,—the bridge—and draining the surface water. My employment by Lilienthal continued about two months, and I had nothing to do with his property over

10,667 there after that time. I naturally kept in touch with the situation about Pleasanton from that time on, as I was interested in the effect of the works—the plans. I knew, in a general way, what the plans were so far as the drainage plans to bring those hop fields into use was concerned.

10,668 My attention was first attracted to the operations of the Spring Valley Water Co. about Pleasanton in 1898. The occasion of that was my employment by the Company to make surveys of lands which they were going to purchase near the Hearst Estate, and the Hadsell property down at Sunol. I understood at the time those surveys were made that the Company was having them made with a view of acquiring properties around Pleasanton for the purpose of developing underground water. I knew that it was the Company's plan at that time to acquire lands for the purpose of developing on them underground waters to be brought to San Francisco. The Company was obtaining options through a third party on lands, and my employment was to see as to the acreage and the boundaries, and also to make surveys, get elevations, grades, and so on, and develop the physical data. I was engaged in that employment, I think, from April to November of 1898, and I had three or four men under me. I knew, at the time of my employment, or about the time of its termination, that the Company had actually made purchases over there following my work. I helped to negotiate some of the purchases. I assisted the man who was conducting the purchases, and I conferred with Mr. Schussler right along during that period, and was under his instructions.

From that time on my interest in the properties continued. I made the survey for the aqueduct down the canyon from the Sunol Dam to near Niles, and it was built substantially on my survey. I made the survey for the location of the aqueduct. The aqueduct was not then designed. From that time on I kept in touch with the operations of the Company over there. For a number of years, from May, 1898 to 1906, I was in Hawaii most of the time, and during that period I was not in very active touch with the work that was done. From 1888 to 1889 I was in rather active touch, as a matter of interest, with the operations of the Company over there.

10,669 After my return in 1906 I resumed the interest which I formerly had in the operations of the Company, and it was rather active, from an engineering point of view. I knew that the Company had driven wells upon its Pleasanton properties, and that it was pumping from those wells, and that the water was being brought to San Francisco. Some wells were driven during my connection with the company in 1898, and in consultation with Mr. Schussler, I assisted in the locations of them. After my return in 1906 I kept in touch with the Company through the papers, but my personal contact was not very intimate. I visited the Company's office, I think, just after the

earthquake. My interest continued, in a general way, until I became City Engineer.

There was an occasion which prompted me to take an active interest in the affairs of the Company between the earthquake and the time when I became City Engineer. When a discussion of the purchase of the property was before the Chamber of Commerce in 1910, I advocated the purchase by the City at that time of all the properties. The acquisition of the properties by the City had been the subject of discussion for a period of three or four years before that, and it would be accurate to say that it was a subject in which the engineers located here had taken more or less interest. The development of the underground waters around Pleasanton was not, at that particular period, a subject in which the engineers about here had taken more or less interest. I think in the period 1911 and 1912 was the most active period of discussion as to the potentiality of those gravel beds. That is to say, after the agitation for the acquisition of the so-called Hetch-Hetchy rights by the City began. That discussion still continues. When I became City Engineer, I immediately began to take a very active interest in the relations between the Company and the City, and from that time on that active interest continues.

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Almost immediately following my entry into the office of City Engineer I began to make inspections of the Company's properties, and I have made quite a number of inspection trips over the property, some lasting over two or three days. In the year 1912 I made tours of inspection, and I think I made at least two in that year. From September, 1912, until the middle of 1913, I made quite a number of trips over the property for the purpose of thoroughly acquainting myself with it, and its potentialities.

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I made a trip to Washington as one of the representatives of the City at a hearing before the Secretary of the Interior, in November, 1912, at which the properties of the Spring Valley Water Co. were a subject of discussion. I felt at that time that I was fairly familiar with the properties of the company. I would not at that time have felt qualified to pass on the question of yields. I heard a good deal about it, and during that discussion and investigation which I made leading up to it, I had concerned myself with the ascertainment of the sources of the Company's water supply, and in a general way I felt familiar with that branch of the subject at the time of that meeting in Washington. I was in consultation with other engineers for some time before that meeting in Washington.

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I think in May or June, of 1913, a resolution was passed by the Board of Supervisors, requesting that I segregate the properties of the Spring Valley Water Co. as to whether used or useful for the purpose of supplying San Francisco and its inhabitants with water, and especially as to their use in connection with the future Hetch-

10,673 Hetchy supply. I have been familiar for years with the practice in California that required legislative bodies of municipalities to establish water rates to be collected by companies supplying water to the inhabitants of those municipalities, and I knew that it was the duty of the Supervisors to fix rates to be collected by water companies supplying San Francisco and its inhabitants with water for the fiscal year beginning on the first of July following my entry into the office of City Engineer. I was called upon by the Board of Public Works to advise the Board of Supervisors of the property used by the Spring Valley Water Co. in supplying San Francisco with water, or which would be used by the Company in supplying San Francisco with water during the fiscal year beginning July 1, 1913, and I made a report to the Board on that subject. Prior to making that report I examined the archives of my office to learn what my predecessors had done, and in addition to that I made an examination with the means and the funds and the time available to acquaint myself concerning the properties of the Company which were used in supplying San Francisco with water. Not having the funds and the means to make an exhaustive examination, I relied to some extent on Judge Farrington's decision. In making that report to the Board of Supervisors, I availed myself of information which I acquired during all of these years of familiarity with the property of the Spring Valley Water Co. so far as the information was then developed.

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I made possibly two trips over the property of the Company between the first of January, 1913, and the date of my report to the Board of Supervisors, which report must have been made some time in either March or April, 1913. I think that it is quite probable that between September 1912 and April 1913 I made four trips over the property. Taking into consideration my familiarity with the property, it was not very necessary that I should make many trips over it, except to examine some special features. I recall one trip was made specifically to examine the abandoned Calaveras dam-site. I went over there with a geologist and examined it before the Washington investigation.

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The construction of the Calaveras Dam began, I believe, in the fall of 1913. I recall that a condemnation proceeding was brought by the City against the Company, and it is my recollection that the construction of the dam was begun before that suit was commenced. Before the construction of the dam began, I was in rather close touch with the company concerning that particular piece of work, and was advised of the Company's plans. I discussed with the officers of the Company the critical condition of the water supply in 1913. We had a dry year previously, and the situation was becoming critical. I believe I warned the City Authorities about the critical condition.

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Intervening the report which I made to the Board of Supervisors in the rate-fixing proceedings for the fiscal year beginning July 1,

1913, and the institution of the condemnation suit, I devoted a good deal of time to the investigation of the Spring Valley properties; possibly from the date of my instructions to segregate the lands, which I believe was in May or June, 1913, until the end of 1913, I possibly devoted as much as 2 months of my own time to this particular work, besides that of a numerous corps of assistants. I got instructions as to the hearing we had on the Hetch-Hetchy grant before the Lands Committee in Washington in June 1913. The Supervisors passed a resolution instructing me to segregate those lands. I commenced that investigation at that time by giving instructions to my assistant, Mr. Hunt, to start certain surveys, especially around Lake Merced, and to do such other work as could be done until I returned. Prior to the filing of the report with the Board of Supervisors to aid it in fixing water rates, I devoted very little time personally; one of my assistants, Mr. Ransom, attended to that branch of the business, being identified with previous reports. I don't suppose I gave that a day's time entirely. The value of the Spring Valley property has always been one of active interest, and I mean by that, that for a long time immediately prior to the making of that report it was a matter of very general interest. That report was over my own signature, and when my office issues a report over my signature, I consider I am responsible for it. In addition to that report I appeared before the Board of Supervisors as a witness, and I appeared for the purpose of supporting that report.

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The question at issue at that time called upon me to give a statement to the Board of Supervisors regarding the property of the best available information in my possession at that time, and that I did. At the time that report was signed and filed, in the light of the time available, and the restrictions prescribed by the Farrington decision, it did set forth the facts ascertainable in the light of the best information which my office had been able to give to the subject. I believe it is customary to call for those reports on the first of January of each year, and this report was made on the 19th of April. It is my recollection that a matter of two and a half months elapsed between the date of the passage of the resolution and the date of the filing of the report, and I think that during that interval I discussed it at least half a dozen times with Mr. Ransom, my assistant. We discussed the methods adopted in previous years in filing those reports, and he got my permission to adopt the same method that year. He went into discussion with me of the method which had obtained during the previous years, and he exhibited to me the reports of previous years.

10,680

Questioned by Master.

Each year the office filed a report with the Board of Public Works at the request of the Board of Supervisors, and in response to a resolution; each of the previous reports filed was available for

our comparison with reference to the whole problem, lands in use and out of use, and the valuation of the property as nearly as it could be got at, and that is what our discussions were about.

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CROSS EXAMINATION BY MR. MCCUTCHEN.

At the time I signed this report, dated the 19th of April, 1913, I was quite as familiar with the previous history as Mr. Ransom was. I don't believe there was any departure in the report of 1913 from the form of report adopted for preceding years. All features of the report were thoroughly discussed between Mr. Ransom and myself, but that discussion was in the light of the keen interest which was then excited on account of the possible purchase of the property by the City. In making official reports from our office, we do not care very much about public opinion; we endeavor to get at the facts and give them as we see them. There was no thought in mind in making this report of the important questions that might arise in the future, and upon which it might have an effect. The report was considered like any other report; it is weighed in the office, and it has to go out over my signature, but as it was purely a formal report, no great importance was attached to it.

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I have known for 31 years that the Spring Valley Water Co. has been claiming that the rates allowed it were inadequate. Nevertheless, I regarded that report as a purely informal matter in this way, that within a year or two a judgment had been given, after an extended hearing, assigning values to the portions of this property; in transmitting this report and compiling it, our office felt that it followed a good precedent in adhering to the court rulings. There was no undue importance attached to the findings of our report, because it was an ordinary incident of the office. I did not know that the Board of Supervisors always had acted on those reports in the past. I had read the Farrington decision, but I don't recall that it appeared in that case that the Board of Supervisors had taken the report of the City Engineer. My experience with the Board of Supervisors is that where it is a matter of judgment they very often don't take my advice.

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I have represented public utilities, and I know that the utilities I represented were of such high standing that the Board of Supervisors accepted the recommendations of their engineers.

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In the preparation of the report Mr. Ransom examined all the deeds of the properties acquired by the Company since the previous report that were properly chargeable, and also omitted the properties not in use, or the properties that had gone out of use, and he gave considerable time to examining the lists of those properties. Mr. Ransom always reported the result of his investigations to me before I approved them. He prepared a map showing the properties which were in use, and which were included in the report which he submitted to me. The properties not in use belonging to the Company

were also the subject of discussion between Mr. Ransom and me. The report specifically set forth the properties which my office considered not in use. I think that Mr. Ransom and I had at least a half dozen conferences on the report, and so far as information was available, I felt before I signed the report that I had all the information necessary to warrant my signing it.

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I was in Washington in May or June, when I received word that the Board of Supervisors wanted me to make a further report concerning the properties of the Spring Valley Water Co., and that resolution called upon the City Engineer to segregate those properties in use and useable in connection with the value of the Hetch-Hetchy supply. I went to Washington about the end of May, 1913.

Mr. McCutchen: The copy of the resolution which I have purports to have been adopted on the 24th of February, 1913, and reads:

10,686

"Resolved, That the City Engineer is hereby directed to prepare
 "a list of properties belonging to the Spring Valley Water Co.,
 "including necessary lands, water rights, canals, reservoirs, dams,
 "ditches, flumes, aqueducts and pipes, or outlets, natural or other-
 "wise, owned or held by said Spring Valley Water Co. in the City
 "and County of San Francisco, and in the Counties of Alameda, San
 "Mateo, Santa Clara, Contra Costa, and San Benito, which said
 "lands, properties, etc., are actually necessary, available, and useable
 "for a source of water supply for the City and County of San Fran-
 "cisco, and which lands and other properties, including distributing
 "system, can be made an integral part of a Sierra water supply.

"Be It Further Resolved; that the City Engineer be directed
 "to include in this list only those properties which are economically
 "and scientifically available for the use of said City and County of
 "San Francisco in its acquisition of a municipal water supply, and
 "exclude therefrom all properties, water rights, etc., which are not
 "economically valuable or useable as adjuncts to a Sierra supply."

Mr. O'Shaughnessy: These resolutions I usually get with a letter of transmittal about two or three days after. The letter of transmittal of my findings in response to the resolutions cites the resolution, and the instructions under which I work.

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This report, dated April 19, 1913, was signed at or about this date. The only way that I could connect the resolution passed by the Board of Supervisors calling for that information, and which I said was conveyed to me in Washington in May or June, 1913, is that a resolution very much shorter than that was passed, requesting a conference with Mr. John R. Freeman as to the segregation of those lands; that may have been at a previous date. I know that this was passed while I was in Washington. It may have been that it was in November, 1913, that that was passed. The hearing before Fisher was in November, 1912, and it may have been passed then. A reference to my records will disclose that.

10,688

ONE HUNDRED AND FORTY-SIXTH HEARING.

APRIL 27, 1916.

Witnesses: H. H. WADSWORTH for Defendants.
M. M. O'SHAUGHNESSY for Defendants.

10,689-90 (Certain corrections noted in the transcript.)

10,690 Witness: H. H. WADSWORTH for Defendants.

Wadsworth DIRECT EXAMINATION BY MR. SEARLS.

10,691 The statement that I made the other day to the effect that the cost of a certain dam on the Yuba River, built by the Government, has been \$5 per yard of concrete, exclusive of cement, and that the cement was \$1.25 a barrel, was incorrect. There have been several contracts on those two dams. The price per cu. yd. of concrete, exclusive of cement, is arranged from \$4.25 to \$6. The price of cement, delivered at Marysville, has been \$2.25 less 20 cents a barrel for sacks returned—that is the cheapest contract—plus the cost of hauling cement from Marysville to the site of the work, 73 cents in some cases, 69 cents and 41 cents, making the total cost of concrete under those various contracts range from \$7.03 to \$7.99—practically \$8. The 15% increase in Mr. Freeman's prices was partly due to the labor cost. Upon looking over such notes as I still have retained, and segregating the cost per foot, and the cost per pound on my final estimate for pipe construction, on which 15% is estimated, I find that \$2.25 for an 8-hour day was the cost for common labor, and that the 15% increase was practically all due to my estimate of the cost of the steel.

CROSS EXAMINATION BY MR. GREENE.

10,692 Referring to "Defendants' Exhibit 204", page 1, under Item "A", the fifth item from the bottom, in the amount \$1,315,000 there is included the cost of clearing the reservoir site, camp buildings, construction roads, camp maintenance, temporary construction of buildings, preparation of foundations, water control during construction, masonry in the main dam, accessories, steel reinforcement in the crest of the dam, gates, plant and maintenance repairs, landscape, architectural treatment, and local engineering, superintendence and contingencies, and the contractor's profits and other overhead charges, amounting to \$589,000. I don't know whether there has been any inclusion for water rights, and I don't think there has been any for land in that \$1,315,000, or in any other of the items there. There have been water rights and rights of way for pipe lines and tunnels, but I am not sure at this time about the reservoir site. I have not allowed anything for water rights in the Hetch-Hetchy, and have made no com-

10,693

putations to determine what the cost of the aqueduct would be, except that projects that require pumping to deliver the water at a head be equivalent to what it is delivered at in others by gravity; that is, projects that deliver the water in San Francisco at practically a low elevation, to compare it with others delivered at a high elevation, I added the capitalized cost of pumping to raise the one to an equivalent head.

I am quite sure that I have not included a pumping allowance in any other of these items than my Sacramento estimates, and I have no data as to what the cost of operating any one of these systems would be so that I could compare one with the other, or any one of these with any other system that it might be desirable to compare it with. It would be taken for granted that in determining the availability or the desirability of two or more systems, I would take into account the cost of operation. It is desirable in bringing a supply from over 50 or 75 miles to have storage at its point of delivery. These estimates are all based on delivery, either in the case of the Hetch-Hetchy for storage in the Spring Valley Reservoirs, or in the case of the McCloud or the Sacramento filtered supply, storage in reservoirs to be constructed in the foothills back of Oakland and Berkeley. I have made no allowance in my estimates here for the reservoirs of the Spring Valley Water Co. I have made allowance for storage reservoirs at or near Irvington. They are under the Mt. Shasta Aqueduct, page 4, under "A", the sixth line from the bottom. That would be the local storage for both sides of the bay; on the San Francisco side in all cases delivery was to the reservoirs of the Spring Valley Water Co. There are no storage reservoirs, except for those three supplies from the Sierras, that is the Hetch-Hetchy, the Lake Eleanor, and the American-Consumnes, which are all designed for storage in the Crystal Springs Reservoirs. There is no San Francisco storage provided for the other systems.

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With the exception of the McCloud and the Sacramento, I propose to utilize the storage reservoirs of the Spring Valley Water Co. on the Peninsula. Taking the Sacramento or the McCloud, the storage reservoirs would be the Mt. Diablo Range Reservoirs, and those two noted under the Mt. Shasta Aqueduct are San Pablo and Pinole Creek. I intend to utilize those two reservoirs as storage reservoirs, without the utilization of any other storage. On the Sacramento supply there was only a distributing reservoir provided; no storage reservoir, and I did not intend, under the plan as I outlined it, to have any storage reservoir for the Sacramento supply, except at the filtration plant. I am quite sure there was a pure water reservoir there, but no greater volume of storage provided for. It would doubtless be better to have a large storage available near at hand. In the case of the Sacramento supply the source of supply is so much nearer that no very expensive storage was considered necessary.

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10,696

Of course these estimates have all—even those which do not deliver water into the Spring Valley Reservoirs—been premised on the idea that the city would acquire the Spring Valley Water Works. As far as Mt. Shasta and Sacramento are concerned, I considered that they would utilize the Spring Valley Reservoirs in case they would be in addition to the Spring Valley supply, and practically they would utilize Spring Valley Reservoirs for storage purposes. There has been no allowance made here for connecting up either the Sacramento or the Shasta supplies with any of the Peninsula Reservoirs of the company. The idea was that the Crystal Springs Reservoir could be maintained to its full storage capacity by other local catchment areas, and I was practically looking out for my hazard, and protecting the continuity of the supply of the entire present Spring Valley system.

10,697 I know the quantity of consumption of water around the bay in 1913. In San Francisco it was something in the neighborhood of very close to 35 million gallons a day. In Oakland and Berkeley, as I remember it now, it was about 18 million gallons a day. For those areas within what was then called the Metropolitan District, which includes San Francisco and the Peninsula towns as far south as San Mateo and Palo Alto, and the east bay towns of Richmond, Oakland, Berkeley, Alameda, and also San Jose, practically the whole region around the bay, excepting Marin County, the consumption was a total of about 75 or 80 million gallons a day, I think.

10,698 It was a part of my function, in the position I occupied with the Government, to determine the availability and the use to which these various supplies would be put, and the times in which it was estimated they would be needed. The consumption was divided up in most cases to three, and in some cases to two installments, which would require certain additions to the main works. The tunnels were constructed for the full 400 million gallons a day supply. The pipe lines were made in two, and in some cases three divisions. The time at which the total of such installation was estimated to be needed was determined.

10,699 For the Hetch-Hetchy I have planned for 160 millions daily, and it was estimated that in the bay region a total of that amount would all be required by 1947, and that the time of construction would extend from 1914 to 1920, consequently, from 1920 to 1947 there would be works considerably in excess of what would be the needed local construction. The 160 million gallons was not necessarily to be put to any use from the period of 1912 to 1947. The works were of capacity sufficient to supply that, but if it were not needed, it simply would not be brought in. Of the 160 million gallons a day, starting from 1914, there would be about 80 million gallons a day, or something like that, disposed of. I think I must be in error on that point. I don't know now whether that estimate of all the water being needed

by 1947, 160 million gallons a day, would be in addition to what the Spring Valley now furnishes. If the local supplies of the Spring Valley Water Co., and the Peoples Water Co., to an ultimate development of 143 million gallons, and from coast stream drainage, as might be reasonably economical to develop, making 37 million gallons more, or a total of 180 million gallons a day, there would be needed in addition 50 million gallons a day in 1942, 100 million gallons a day in 1948, 150 million gallons a day in 1953, 200 million gallons a day in 1957, 250 million gallons a day in 1962, and 300 million gallons a day in 1966, and 400 million gallons a day in 1975; those are my figures.

Up to 1942 you could not use more than 50 million gallons out of the 260 million gallons that I propose to bring in from the McCloud source.

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I think you will find another statement to the effect that although these quantities would be required, if all the local quantities were developed, that under that estimate I have assumed it would be more economical to develop some of the other sources, and not to the full extent of the local supplies, and that is my opinion.

I will read a statement in general terms on the basis of the development of those supplies: "In making these estimates, the dates "on which successive installations are considered necessary, are not "those given, as previously stated, which would be required after "local supplies had first been developed to the extent there shown, "but are the dates on which it has been assumed to be most economical "to bring in the outside supplies. Those dates are as follows: 100 "million gallons daily in 1920; 140 million gallons daily in 1940; 200 "million gallons daily in 1960; 285 million gallons in 1980."

The 100 million gallons daily in 1920 I will use for municipal uses in San Francisco. In 1920 I estimate there would be in San Francisco a total need for about 55 million gallons daily, and for the total Metropolitan District of 100 million gallons daily. I think that in 1920 the requirements of the bay district would be about 100 million gallons a day. Evidently the existing supplies would have to be sidetracked to some extent under those figures. Apparently they would have to be sidetracked to the extent of 80 million gallons, which is all they are being used for.

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10,702

Practically all of these figures were prepared in 1912, referring to Hetch-Hetchy, page 1, and were simply re-assembled two weeks ago, at the request of Mr. Searls. Looking under Item "B", you will find "Pipe line, Millbrae Gates to San Francisco, not included in first "installation"; the point was, it should have been included in the first installation. That item was included in the original estimate for the total 4 million gallons a day, but dividing up into units of construction it should have been included in the first installation, but was

omitted therefrom. It did not appear in this report I made for the first installation, but it appeared in the estimate for the completed works.

10,703 In practically all of the items there was an allowance of $4\frac{1}{2}\%$ a year on construction costs for one-half the period of construction. On some of the items, and perhaps on all, I assumed a period of construction of three years. I figured interest on expenditures during construction $4\frac{1}{2}\%$ for three years on one-half of the cost. The whole work would not be under construction extending over the period of six years, 1914 to 1920.

10,704 The Sacramento supply was to be pumped to an elevation of 200 feet, I think. It was proposed to deliver it by the conduits I provided at an elevation in San Francisco of about 140, and to be raised by pumping to elevation 200. It was not my assumption, necessarily, that at that elevation you would supply the entire city. It was the substantial equivalent of what the other sources would deliver the water at without pumping. In other words, University elevation is what I have in mind, practically.

My figure of \$2.25 was the minimum as to the cost of cement delivered at Marysville, with a rebate on sacks of 20 cents. The maximum that I have is \$2.50 at Marysville, with a rebate of 20 cents, making it \$2.30.

RE-DIRECT EXAMINATION BY MR. SEARLS.

10,705 I think of these projects, the Hetch-Hetchy, the Eleanor-Cherry, and the American-Consumnes, contemplate power development. If it should turn out that the construction of the completed work was somewhat in advance of the demand for the total capacity of those works, the profit from the water development would aid in taking care of the interest on the investment. The estimates as made after the total cost was worked out gave the credit that should be given to power development on the various projects; that, however, was not taken into account in the first installation estimates that I have submitted here. On the Hetch-Hetchy project fully developed there is a net credit to the project after capitalizing the estimated value of the power, and deducting from that the cost of the plant, of \$45,000,000. That is, with the total 400 million gallons development. The credits for the total development on the Eleanor-Cherry, Stanislaus, Mokelumne—\$37,250,000; on the American-Consumnes it is \$24,000,000. There was none for the others.

RE-CROSS EXAMINATION BY MR. GREENE.

In stating that there is a credit of \$37,000,000 on the Eleanor-Cherry project, that was based on a total development of 400 million gallons; that is for the completed development system on the four combined watersheds. The amount of water is the same as the Ameri-

SPRING VALLEY WATER CO. VS. CITY AND COUNTY OF SAN FRANCISCO

can-Consummes, but the amount of power is different. In reaching those figures, I estimated that when the water was all delivered, that there would be a market for all the power, or that the city could use it for its own activities. I do not think there was any reduction from this credit on account of possible carrying charges up to that time. 10,706

The cement on the Yuba River Dam averaged very nearly a barrel to the cu. yard. Most of the Yuba River concrete construction was one part of cement, two of sand, three of small gravel, and four of small cobbles or gravel up to about two inches in diameter.

Mr. Searls: I don't think with respect to any of the supplies but the Eleanor and the Hetch-Hetchy, that the price of water rights is anything more than a rough estimate, because one of the plans there involved raising certain lakes; they all had very different features. I don't think any actual prices have been obtained. 10,707

Witness: M. M. O'SHAUGHNESSY for Defendants.

O'Shaughnessy

CROSS EXAMINATION BY MR. MCCUTCHEN.

10,708

(It was agreed between Counsel that so far as the unit cost figures that come in, either from Mr. O'Shaughnessy, or from Mr. Wadsworth, on this matter, they are not to be claimed to be a criterion for other similar unit costs which might have come up in the earlier examination. Counsel for Defendants made this one exception, that he would like to have Mr. O'Shaughnessy's figure for the cost of cement as the price the city is paying for cement today.)

Mr. O'Shaughnessy: The resolution which was passed on February 24, 1913, known as Resolution No. 639 of the Board of Supervisors, was received by me when I was in Washington in the last part of February, and the first part of March, 1913. I must have gone to Washington on that trip about the 22nd or 23rd of February, and I left Washington the day before the President was inaugurated. I think I returned to San Francisco about March 7th, and from that time on was in San Francisco, attending to my official duties, until June 8th. It was between the 24th of February and the 3rd of March, while in Washington, that I was advised of the passage of this resolution. Prior to receiving this resolution, there was the notification in January about the preparation for the annual rate hearing; that is, calling for a valuation of the properties in use in supplying San Francisco with water. That is the resolution that was passed on the 27th of January, and in answer to which I filed my report of April 19th, so that approximately six weeks before the report of April 19th was signed and filed, I had been advised of the passage of a resolution calling upon me to designate the properties belonging to the Spring Valley Water Co. which could be used, or were necessary to be used in connection with a Sierra supply. 10,709 10,710

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My report made in response to the resolution, which was a request for the segregation of properties to be acquired by purchase or condemnation, was for the purpose of informing the Board of Supervisors what properties of the Spring Valley Company should be acquired to be used in connection with the Hetch-Hetchy supply. I filed a report in response to that resolution, which report was made under my personal supervision, and as the result of my personal investigation.

The following report was read by Counsel for Plaintiff:

“CITY AND COUNTY OF SAN FRANCISCO,

Department of Public Works,
Bureau of Engineering,
City Hall.

COPY.

November 19, 1913.

To the Honorable Board of Supervisors,
Of the City and County of San Francisco.

10,712

Gentlemen: In accordance with your journal resolution, No. 639, of February 24, 1913, requesting this office to transmit to your board a list of properties belonging to the Spring Valley Water Co., necessary, available and useable for a source of water supply for the City and County of San Francisco, and which lands and other properties, including distribution system, can be made an integral part of the Sierra Water supply. I beg herewith to transmit for your information an atlas, together with an exhibit containing descriptions of the properties delineated in such atlas. You will also find a list showing the lengths and sizes of pipe in the distributing system inside the city limits. The properties set forth in said atlas and exhibit are selected and designated as those called for by the terms of your aforesaid resolution.

The most complex problem in connection with this work was the segregation of necessary lands around Laguna de la Merced, so as to conserve this body of water from contamination by future settlement and development. I believe it is possible to accomplish this object by the construction of a boulevard around this lake, which will permanently arrest undesirable drainage, and at the same time open for settlement a very desirable section of the City of San Francisco.

All phases of this problem have been very thoughtfully considered, and it is believed that the segregation made will accomplish this object, as well as render possible the opening up of some public park grounds in the southern section of the city for the uses of the inhabitants.

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I therefore recommend that arrangements be made with the Spring Valley Water Co. for the construction of such a boulevard of a width of eighty (80) feet, the center line of which for considerable length shall be the dividing line between the land to be acquired by the city, and those to be reclaimed by the water company.

I further recommend that in connection with the acquisition of these lands arrangements be made, either by agreement, or by the terms of the decree in condemnation, by which no buildings can ever be constructed within one hundred and fifty (150) feet of the center line of that portion of such boulevard, on the westerly side of the lake, between the southeasterly corner of the United States Military Reservation and the County Line between San Francisco and San Mateo.

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Due to the destruction of many records by the fire, the accumulation of all the data contained in this report has been a tedious task of several months, and I desire to express my obligations to the active co-operation of the City Attorney's Office in verifying descriptions and clearing up records. The Spring Valley Water Co., through its engineering department, co-operated also to the fullest extent in the restoration of missing descriptions.

Respectfully submitted,

(Signed) M. M. O'SHAUGHNESSY,
City Engineer."

Mr. Shaughnessy: That is the letter of transmittal which was accompanied by an atlas, and, I believe, a list of the properties. My statement in the letter that the most complex problem in connection with this work was the segregation of necessary lands around Laguna de la Merced meant the selection of lands so as to provide for the future purity of the water of the lake.

My final conclusion that these were the only lands necessary, assuming certain works to be constructed, was reached after long consideration of the subject. Before I made any investigation, I thought a thousand acres would have been the proper amount to reserve around the lake. I recall I made one preliminary map, outlining substantially the quantity of land I desired, and I held various conferences with engineers and employees of the company, and they had very diverse views as to the area of land we needed. In fact, they wanted to crimp the area down very much smaller, and leave us 500 acres, including the lake, for use. It was only after months of treaties and negotiations, and discussion of various features, that the final boundaries were agreed on. All of that discussion was with reference to the use of these lakes, and this portion of the Lake Merced Tract as an integral part of a water supply, the principal source of which was to be the Sierras.

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When I made that report to the Board of Supervisors, I expected the Merced Lakes to be used as a portion of the water supply, but I did not expect to deliver water from other sources into the Merced

10,716 Lakes. I did not expect that the Merced Lakes would furnish water for the daily use of San Francisco; due to the inferior character of the water as a water proposition purely, I would not care to incorporate it into a part of our municipal water supply system. Its largest use is for a reservoir in case of earthquake or a calamity taking place in the future. It was a matter of the greatest importance that the water should be uncontaminated, and that is why I made those provisions for a boulevard and drainage, and the exclusion of cultivation and intensified farming inside this area. I considered the exclusion of the farming operations quite vital, and I considered it quite vital to impose restrictions upon the construction of buildings upon the remaining portions of the Lake Merced property. I considered it important to impose as a condition the construction of a boulevard 80 feet wide. None of those things were in contemplation or existed when I made my report on the 19th of April, 1913, as an aid to the Board of Supervisors in fixing water rates. The situation which I was dealing with when I made my report on the 19th of April, 1913, was an entirely different situation from that with which I was dealing when I made my report on November 19, 1913.

10,717 I did not consider that all those lands around Lake Merced were being used for a source of supply. I stated the other day that when I signed the report which Mr. Ransom prepared, I did so after going over it carefully, and knowing its contents, but with this qualification, that the questions Judge Farrington passed upon we absolutely accepted. Judge Farrington passed on the question of all these lands tributary to the lakes, and we did not raise the question as to any segregation, so I believe we had justifiable grounds for doing so, because at the date of Judge Farrington's decision I don't believe those lands were in farming use. They were being used for farming purposes on the 19th of April, 1913, when I made my report, and I was very familiar with that use. I was in the habit of going on the property frequently about that time, and I was making at least weekly visits to it, and with the time at my disposal, I was very familiar with it. I am in the habit of playing golf out there, and was very familiar with the property, and the uses to which it was being put.

10,718-19 The following report was read by Counsel for Plaintiff:

“CITY AND COUNTY OF SAN FRANCISCO.

San Francisco, April 21, 1913.

Department of Public Works,
City Hall.

Subject: Appraisement of Spring Valley Properties.

To the Honorable the Board of Supervisors.

Gentlemen: There is herewith transmitted, an appraisement prepared by the City Engineer, of the properties of the Spring Valley

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Water Co., actually used in furnishing the City and County of San Francisco and its inhabitants a pure and wholesome supply of water.

This appraisalment was prepared in accordance with the provisions of Resolution 9968, New Series, of your Honorable Board, and approved by this Board by Resolution 23,311, second series.

Respectfully,

BOARD OF PUBLIC WORKS,

By (Signed) F. J. CHURCHILL.

CITY AND COUNTY OF SAN FRANCISCO.

San Francisco, April 19, 1913.

Bureau of Engineering,

Department of Public Works.

To the Honorable the Board of Public Works.

Of the City and County of San Francisco.

Gentlemen:

Appraisalment of Properties of Spring Valley Water Co.
for Rate Fixing Purposes.

By Board of Supervisors' Resolution No. 9968 (New Series) the Board of Public Works is directed to submit to the Board of Supervisors an appraisalment of the properties of the Spring Valley Water Company actually used in furnishing the City and County of San Francisco and the inhabitants thereof a pure and wholesome supply of water for the purpose of enabling the said Board of Supervisors to establish a basis of valuation of said properties upon which it may fix and determine water rates to charge said City and County of San Francisco and its inhabitants for the fiscal year commencing July 1, 1913, and ending June 30, 1914.

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In making this appraisalment the Board of Public Works is directed to submit a list of all lands, water rights, reservoir sites and changeable properties of all kinds of said company, together with a specific statement of valuation in each instance.

The following appraisalment is based upon the recent decision of Judge Farrington in the United States Circuit Court, which fixes the valuation of property in use during the year 1903-4, and the cost of such properties added to the holdings of the Spring Valley Water Company since 1903 as are at present being used in supplying water to the City and County of San Francisco.

From various reports made by the Spring Valley Water Company to the Board of Supervisors and the reports made by the City Engineer concerning the valuation of said properties for rate fixing purposes, a list has been prepared of all properties purchased or constructed by the Spring Valley Water Company since 1903.

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All of the real estate valued by Judge Farrington in the suit of 1903-4 has been plotted upon a map, to which has been added each separate parcel of land acquired since the date of Judge Farrington's decision, with an identification number on the plot of each parcel. Using this map as a guide there have then been prepared two lists showing the cost and acreage of real estate now in use and the cost and acreage of real estate not now in use in supplying water to the City and County of San Francisco.

Other lists have been prepared showing the cost of physical property constructed or purchased by the Spring Valley Water Company since the date of Judge Farrington's decision, and the depreciation to date of the physical value of all properties now used by the Spring Valley Water Company in supplying water to the City and County of San Francisco, and the present annual depreciation of such properties as calculated in accordance with the principles laid down in Judge Farrington's decision.

JUDGE FARRINGTON'S DECISION:

The valuation summarized by the Court after exhaustive study is as follows:

1	1,880 acres reservoir land.....	\$1,880,000
2	40,379.52 acres watershed land	3,947,712
3	2,730 acres Lake Merced property.....	3,382,600
4	Water rights	2,100,000
5	Rights of Way	200,000
6	City Reservoir Sites	587,850
7	Pump Tracts	71,019
8	Bryant Street pipe yard and building.....	65,000
9	Office lot, building	179,217
10	Meters	150,000
11	Stock on hand	270,000
12	Crystal Springs system	2,717,359
13	Alameda Creek System	2,466,092
14	Pilarcitos system	846,139
15	Lake Merced drainage system	232,454
16	San Andreas system	1,139,623
17	Locks Creek System	289,866
18	City distributing reservoirs	639,499
19	Pumping Plants	1,216,207
20	City pipe system	4,500,000
21	Special structures	59,316
22	12½% for engineering and interest during construction	1,764,569
	Total	\$28,694,522
23	Less depreciation	2,922,538
	Total value of property	\$25,771,984

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From which should be deducted the value of property
not now in use as follows:

2	Office lot and building	\$ 179,217	10,722
14	Pilarcitos pipe line	303,235	
	Lake Honda tank.....	4,000	
	Ocean House flume	9,233	
16	College Hill aerator	1,772	
20	City pipe system, estimated damage by earthquake of April 18, 1906, (See Municipal Reports 1905-6 and 1906-7, page 822)	200,000	
	Total	697,437	

From which we have as the value in 1903 of property
which is in use to-day..... \$25,074,527

Since 1903-4 the Spring Valley Water Company have raised the height of the Crystal Springs Dam, thus increasing the area of the reservoir by some 214 acres, and under the principles laid down in Judge Farrington's Decision (See Page 46 of Judge Farrington's decision), reservoir lands should be valued at \$1,000 per acre and watershed land at \$100 per acre. This 214 acres have now become reservoir lands, therefore their value should be increased by \$900 per acre, or \$192,000, which added to \$25,074,527, gives us.....\$25,267,127.00

To this should be added the value of properties acquired since 1903. as follows:

2	25,274,707 acres watershed lands,	2,439,662.39
3	165.5 acres Lake Merced property.....	190,526.85
4	Water rights	56,271.60
5	Rights of way	324,067.52
6	City Reservoir sites	3,594.30
7	Pump tracts	17,587.50
	Street assessment work in San Francisco.....	2,693.70
	Physical improvements	2,131,485.50
		\$30,433,011.36

From this should be deducted the depreciation of physical
properties 2,313,959.22

Leaving\$28,119,052.14

as the total value for rate fixing purposes of properties owned by the Spring Valley Water Company and in use in supplying water to the City and County of San Francisco. 10,723

There are attached hereto the lists from which the values of watershed lands, Lake Merced properties, water rights, rights of way, City Reservoir sites, pump tracts, street assessment work, physical properties, and depreciation have been compiled.

For your information there is also attached a list of the cost and acreage of properties added to the holdings of the Spring Valley Water Company since the date of Judge Farrington's decision but not at present in use and a list showing the estimated annual depreciation of the physical properties of the Spring Valley Water Company in accordance with the principles laid down in Judge Farrington's decision.

10,724 Attention is directed to the fact that this appraisal contains no allowance for appreciation in value of properties appraised by Judge Farrington, no allowance for the value of reservoir properties in the Alameda Creek system, which the Spring Valley Water Company claims are at the present time being used as reservoirs, nor any allowance over their original cost for properties purchased since 1903-4. The valuation given in this appraisal, therefore, is to be considered as the value for rate fixing purposes only and should not be confused with the amount which it would be reasonable for the city to pay in the event of its desiring to purchase the properties of the Spring Valley Water Company in their entirety.

Respectfully submitted,

(Signed) M. M. O'SHAUGHNESSY,
City Engineer."

The list that is referred to there is added to the report from which I read, and our offer ought to include that list.

Mr. McCutchen: We will get a copy, which will be offered as an exhibit, and to that will be attached this list.

CROSS EXAMINATION BY MR. MCCUTCHEN.

When I stated that valuation made was for rate fixing purposes only, I meant the valuation of the properties delineated in that report. I am still of the impression that I thought at the time that the report was made there were portions of the Lake Merced properties not then in use for supplying San Francisco with water because of the agricultural activities upon parts of the property.

10,725 The reason I did not state in my report that these portions of Lake Merced other than the 811 acres were not then in use for the purpose of supplying water to San Francisco and its inhabitants was due to the fact that the whole of Lake Merced was included by Judge Farrington, and while I had my own opinions as to the accuracy of his judgment in that matter, I bowed to his judgment, and let that matter stand. I did not suggest that in my report.

10,726 I included the office lot and building, the Pilareitos pipe line, the Lake Honda Tank, and Ocean House Flume, the College Hill Aerator, which were the items that had been included by Judge Farrington as deductions for property not now in use. On the next page I put down another net of \$25,267,127, to which I say "should

be added the value of properties acquired since 1903, as follows: 25,274.707 acres of watershed land; 165.5 of Lake Merced property''; of course, new acquisitions were claimed to be in use, and perhaps I stated here that they were in use, but I practically based that statement upon Judge Farrington's decision, because Judge Farrington said that all the lands tributary to Lake Merced should be included, and these being lands tributary, and included inside the exterior boundaries, were included according to the Farrington theory, but it was my opinion at the time I signed that report, and at the time I made that addition of the 165 acres of Lake Merced, that that particular property was not in use. The works which I say should be constructed in the event that only 811 acres of Lake Merced properties are to be used, had not been constructed at the time of this report, and have not yet been constructed, but in the event that the area is to be limited to anything like 811 acres, and the water is to be used even in emergencies, those works should most certainly be constructed. The cost of those works would not be possibly a quarter of a million dollars, whereas, the enormous value claimed for this property is possibly ten times that much, so it would be folly to retain a lot of land of very high value on the pretext of protecting a lake, when a very simple construction of works would accomplish the same object. The engineers of the Company at that time endeavored to confine the area to be acquired by the City to about 500 acres. I don't know what their motive was, but my statement was that it was to be a part of the system for supplying the city.

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The report of April 19th was a formal report, such as was usually transmitted by my office to the Board of Supervisors for a particular purpose. The entire time, perhaps, I was able to devote to that report did not exceed one day. This other report was made after mature consideration, involving over 2 months of my time, and is no comparison at all as to the effect or the sense of both reports. For the most of those two months I devoted myself to the lands and properties that were safe and desirable for us to acquire in the light of the knowledge and the information we possess. We were only going to take over such properties as would fit in as an integral part of the Sierra supply, as the resolution of the Supervisors called for.

When, in the early consideration of the Lake Merced lands I suggested that the City should have a thousand acres, it was because I believed the acquisition of that area was necessary to protect the water supply, and it was a part of my plan to construct some protective works. I devoted more time to the Lake Merced property in preparation for that report than I did to the other features of the Company's properties. The main reason that made the Lake Merced problem complex was the financial reason, the desirability of excluding as much valuable land as possible, that was of no value as a water supply, from the purchase price of the City.

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Questioned by Master.

The problem was practically the question of striking a balance between the desirability of having a protected area and the large cost of that protected area, and then again, I thought, and afterwards proved, that by making this boulevard, as I suggested, the protective work could be accomplished in a very simple manner.

CROSS EXAMINATION BY MR. MCCUTCHEN.

10,730 From looking over the previous reports prior to the making of my report of April 19, 1913, I saw that the City Engineer had always treated that Lake Merced property as property in use for supplying San Francisco with water. In those very early days, before Judge Farrington rendered his opinion, the lands were entirely and exclusively used for protective purposes; there were no farming operations conducted on them.

10,731 When I say "protective purposes" I mean water protective purposes, which is not the same thing as water production. Production signifies an increase in quantity, or the creation of something, whereas protection signifies the saving of the commodity from some things. It was my understanding that up to the time these properties were used to some extent for agricultural purposes, they had, during their ownership by the Company been used exclusively for the purpose of protecting that water supply. The use for agricultural purposes is the only exterior influence I observed. I know the use for agricultural purposes was subsequent to the year 1894, and it was very perceptible in 1912 when I went around the lake examining the ground. Undoubtedly, the income that was derived from the use of that property for agricultural uses had been put to the credit of the Company's earnings, but the consumer did not get the benefit in the quality of the water. I believe it is a safe treatment to say the Company derived no benefit from that in which the consumers did not participate.

10,735 Before making this report of November 19, 1913, I devoted a good deal of time to an examination of the situation on the other side of the bay, and also had two or three of my assistants make a very comprehensive examination of that whole situation. Accompanying this report was an atlas. At the date of my report I was not intimately familiar with each individual tract of the Company's properties in Alameda and Santa Clara Counties. My investigations with regard to the Pleasanton tracts had not been completed on the 19th of November, 1913. I had had the matter under advisement for at least 6 or 7 months before making this report, but the data that was available was so very confusing, contradictory, conflicting and erroneous, that I did not have a complete analysis made of the problem so as to be absolutely safe on the City's side, and so, therefore, 10,736 I concluded that I would recommend taking all of those lands; after-

wards I modified that situation by eliminating certain of those lands, and instead of taking total areas, just taking two strips running through the valley at right angles to each other, which I thought would enable us to physically take whatever water was there. I thought possibly by running two strips at right angles through those lands, and putting down strings of wells along those two strips, that we would probably be able to take whatever water was available. I was seeking to accomplish the physical opportunity of extracting water from the sub-surface areas. If the wells were operated, and the water plane lowered, there would be bound to be an influence on the adjacent lands. The condemnation suit was filed on the last day of the year, 1913, and this new arrangement came about as a result of an arrangement for prices between attorneys for the City and the attorneys for the Company. With the information developed by our engineers as to the character of the underground gravel, our attorneys thought we could get along with about 1,000 acres, but it was my opinion that it was desirable to get those strips in addition, and the Company finally agreed to give us those strips, and as a part of our arrangement we reserved right as against all of the retained lands of the Company. The information was not available at the time the condemnation suit was filed. The information that was unavailable was an exhaustive study which we made for over 823 days of the character of those gravel beds, the quantity of water withdrawn, and the fluctuations of the water plane underneath the lands. That 823 day period commenced the first of October, 1911, and ended December 31, 1913; in other words, the measurements ended before I made this report, but the compilation of the report, and the assembling of all the data, was not completed until May 31, 1914.

It was my understanding that the Company purchased those lands for the purpose of supplying water to San Francisco, but I would not say that they were actually being used for that purpose at the time of making that report. It is my opinion that a lot of those lands could be safely excluded. The quantity of the yield might have influenced me in determining whether they were in use or not at that date. The thing that subsequently influenced me to take that course and provide for the driving of a string of wells was the desirability of having some way of getting all the water that those lands would produce without the City buying the lands themselves, and a part of the bargain was a right as against the Company to take the quantity of water from those wells which the City wanted.

I knew roughly what the yield had been at the time this condemnation suit was brought, but there was gross misinformation by various alleged experts as to what those gravels would produce. I believe your company was deceived as to their productiveness. The

reports which I subsequently got, and which convinced me that I could not get from the land the yield which I had anticipated were exhaustive measurements made by reliable assistants of my office as to the fluctuations of the water plane during this 823-day period. At the hearing before the Secretary of the Interior in November, 1912, there was a good deal of conflicting information which left me in a very confused state of mind as to what the product of that area would be. The records which Mr. Cyril Williams produced on that subject as a witness for the City at that time, were not in a satisfactory state for me to base conclusions on. The information which I subsequently got is more thorough and more exhaustive. I cannot recall now what his conclusions were as to the output of the gravels, but I do know what the claims were as made by the Company as to the volume of water that could be got from those gravels. It is not a fact that that change of plan came about solely and entirely as the result of negotiations between the City and the Company. If I thought that it was necessary to retain all those lands to get a volume of water out of them, I would not change a recommendation to conform with the request of any city official. There were negotiations between the attorneys as to reducing the price of the lands when a question of compromise was arranged in the price by excluding those lands. When the matter was brought to my attention I said

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I would have no objection to the exclusion if the Company guaranteed a certain quantity of water. Mr. Olney positively declined to guarantee any quantity of water. There was an impasse between the Company and the City for nearly 6 weeks, and finally this alternative arrangement was made by which those two strips, one up through the center of the valley, and the other at right angles, were granted to the City to give them the means of taking out this quantity of water, at least 10 million gallons. I did not regard the lands as very valuable then for water. It was a matter of importance to secure the rights of the City to the water that was being supplied to it. What I was after was a continuous supply of water. By this arrangement which I suggested, we were not entirely stepping into the shoes of the Company as the owner of those lands for all water production purposes, because the Company reserved the fee to the lands, and also reserved the right to withdraw water for irrigation purposes on the particular lands.

Those waters were to be used on those lands, and not conveyed elsewhere, because the Company insisted on retaining the right to irrigate the lands for agricultural purposes. This was very objectionable to me, because it withdrew a quantity of water from the available water, and made our purchase less desirable. I would rather have had the water without any conditions. The acquisition of this strip, under those conditions, came about as the result of extended negotiations extending, possibly, over two months.

Even though I found these lands were not in use at a subsequent time, I wanted them, because I was influenced by the belief that there might be some truth in some of the allegations made by the Company's experts as to the volume of water there was available. If there were 40 million, or 50 million of gallons up there, or 72 million gallons a day, as one of your experts claimed, I would want every acre in that valley. At the time I made this report I thought that the experts were exaggerating a great deal in stating that you could take 72 million gallons a day out of that reservoir. I thought we could take out possibly 20 million gallons a day from that one source, and that was my opinion at the time I made this report. After all this investigation had been made, I concluded that the output of that property would be about 10 million gallons a day, which was the amount that I wanted the Company to guarantee. The arrangement which I made reserved the right to take 15 million gallons a day, and I thought for short periods of the year we could withdraw at the rate of 15 or 16 million gallons, but not for a continuous supply. 10,744

When I thought the basin would yield 20 million gallons a day, I meant that amount for a continuous supply, and I considered it was a safe investment for the City to make in acquiring those lands. When I concluded that they would not yield more than 10 million gallons a day, I reached the conclusion that the acquisition as a whole was undesirable. If we could not get that right, we would take the lands. Of course, I believe the Company went ahead in good faith, but without the proper intelligence and information to make those very heavy investments. 10,745

If I had been the engineer for the Company at that time, I think I would have gone on with another development. I would have built the Calaveras Dam. I would not have thought to avail of this particular source. I believe this is far more expensive development than the Calaveras Dam, which could be built to a useable height in possibly 18 months. Of course, the finding of water is a simpler proposition at Pleasanton than the creation of water at Calaveras. I think it is alright to avail of the supply at Pleasanton, but I do not think it was good policy to buy so much land there. You have the right to condemn a water right; in other words, the Company was confronted by one of two alternatives; to buy the land, or to get the water right by condemnation. 10,746

The flood rights of a stream, and the subterranean flow on land are different. Acquiring the first thousand acres, and the possibility of withdrawing the water, I think was a wise measure, but I question the business judgment of paying exorbitant prices for lands all through that valley. With the information available, it was my business judgment on the 19th of November, 1913, that those properties ought to be acquired as part of the water supply. I did not think 10,747

10,748 that I had sufficient information in November, 1913, to warrant me in advising the City to buy that land, and that is why I prosecuted this investigation. The Board of Supervisors demanded a report of me, and I handed it down with the very best ability I possessed, and the use of all information available, and I intended it to be as near final as I could make it. I would not call my finding a mistake. I was very well satisfied with it with the information I had available.

10,749 I said the average product of those lands was 10 million gallons a day throughout the year, but that at certain periods there might be withdrawn at the rate of 15 million gallons a day. The question of acquiring these lands which might be desirable if they would yield 20 million gallons a day, and inadvisable of acquirement if the limited yield was 15 million gallons a day, was not a question of price; the first question was the protective policy of the City to take all of the water that was being used. That was the dominant consideration; the price was secondary. If they had yielded 20 million gallons a day, I would recommend taking them. It wasn't a question of price. I would say that in segregating the lands of the Company I took the properties that were producing water, whether they were Lake Merced lands at \$2,000 an acre, or Pleasanton lands at \$200 an acre, and as I was concerned with taking the properties that were yielding water, which was then being supplied to San Francisco and its inhabitants, it was for that reason that I included these Pleasanton lands. In the condemnation proceedings I have included all of the lands in and about Calaveras, and leading down from that site to the Sunol Dam, or the filter bed; in my testimony here I have included only a comparatively small part of those lands. In my report, dated April 19, 1913, in which I was advising the City as to the properties in use in supplying San Francisco and its inhabitants with water, I included all the lands pertaining to Calaveras and San Antonio, if there are any San Antonio lands there. When I made my report of April 19, 1913, I was fairly familiar with those lands, and the uses made of them. I understand that those lands are now used for agricultural purposes. Whether it would be advisable for the Company to sell them to people who would use them unrestrictedly for agricultural purposes, depends on the Company's plans for expanding its water supply system, but so far as the present is concerned, I don't think it would make any difference.

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It is my understanding now that for the years in question, so far as the rates are contested, that the ownership of these lands was an object of indifference to the City, and to the rate-payers, and they could be disposed of. If my opinion were asked with reference to the advisability of disposing of those lands, I would say to the Board of Supervisors that it was a matter of indifference to the city.

I found in the archives of my office, reports made for many years

past by my predecessors, telling the Board of Supervisors that those lands were in use.

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When I made the report of April 19, 1913, I was not as familiar with the uses to which the lands were put as I was at the time I began my testimony here. I acquired a vast amount of information in the last couple of years in regard to this whole problem; not particularly in regard to the uses made of those lands. I had not gone over that part of the Company's territory a great many times prior to April, 1913. I was never up to Calaveras until November, 1912. I made a number of trips up there during 1913, and I went along the road that follows along the ridge from the Calaveras Dam down, and partly along the valley.

In my cost estimates on the Hetch-Hetchy project I assume water would be delivered in San Francisco at 170 foot level. That is, at a level corresponding to the University Mound Reservoir. The additional capital expenditure required to deliver water to the Lake Honda level could be computed at the rate of 3 cents per million gallons one foot high. That is cost of installation and operation, and would include capital expenditures.

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Mr. Metcalf: It is true as to the fact that a great deal of the water would have to go to University Mound; it would not be taken to Honda and then dropped back, but Mr. Hazen made all of his comparisons as to the cost of water per million gallons daily capacity on the basis of water delivered to the Lake Honda level, whether it was taken from the Peninsula source, or the Calaveras source, or the Merced or Sacramento—they were all made on the same basis, so that they might fairly be compared.

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Mr. O'Shaughnessy: I make the cost of delivering all of the 60 million gallons which I bring in under my Plan "A" at the Honda level \$360 a day. That would be the cost after installation for lifting the water that additional height. The cost of the installation to accomplish that lift I have not any figures on. This plan I gave you for the Hetch-Hetchy, figures delivery at the city boundary, and I have no storage reservoir in there as yet as a part of my plan.

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Mr. Metcalf: Mr. Hazen in his figure per million gallons of capacity assumed that the water would be delivered at the Lake Honda level, and all the expenses incident to bringing it there, both the pumping and the care of the line, and the maintenance of the line, and the operating expenses, would be included in the capitalized expense. We were of the impression that you had, in the first place, delivered water at University Mound level, and not Lake Honda, and in the second place, that you had not included in your capital expenditure the cost of the pumping station to do that pumping, and the third place, you had not included the cost of taking care of the conduit from Hetch-Hetchy to University Mound, the capitalized cost of which was included in Mr. Hazen's figures.

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Mr. O'Shaughnessy: Of course, that is the peculiar method used by Mr. Hazen, of delivering all the water at a higher elevation than where it is used. You are aware of the fact that 37% of the water is used at the University Mound Reservoir, so that it is an unfair figure, and an unfair principle to assume that the water would be pumped to a higher level, and then dropped down again. The portion of the water delivered at University Mound should be allowed for in any computation, and then the water pumped to the higher levels added on to the cost to give you a fair equivalent. I have not taken anything of that kind into consideration. This figures for delivering the water at the University Mound Reservoir, and you can figure the operating cost of \$360 a day for pumping if it were to be delivered at the Lake Honda level.

Questioned by Mr. Searls.

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Mr. Metcalf: If we had a gravity supply delivered at University Mound Reservoir without any pumping, and the Spring Valley supply which has to be pumped to any level, except that portion which comes from San Andres, it would make a difference, of course, if we assumed a cost of pumping of all the alternative supplies to the Honda level. I suppose the reason that Mr. Hazen made his comparison on the basis of the Honda supply was that a very considerable portion of the water is delivered and used from that source, and furthermore, that the Calaveras supply, when brought in, will be utilized from that level by gravity. He made all of his comparisons on that basis. He might, of course, have made all his comparisons on the basis of delivery into University Mound. I think it was probably the consideration of the San Andres level and the Calaveras level that led him to do it. I don't think it makes any difference on what basis you use it, provided you compare the cost of all the supplies on the same basis.

Of course, it is true, so far as the actual use of a portion of the water at lower level is concerned, that where you have your mountain supply coming in by gravity to at least the University Mound level, you lose all the benefit of the capitalization of pumping up to that level, which the Spring Valley has to do, either through its booster pumps, or its pumps at Belmont. The Honda district is the biggest consumption, and as time goes on it will become more and more important. The low level will not grow nearly so rapidly as the high level. The high level is the important one.

It was only our desire that comparison should be made on exactly the same basis, and we had the feeling that Mr. O'Shaughnessy's figures on the capacity cost per million gallons were made on a totally different basis to that used by Mr. Hazen. All that we wanted was that the comparison should be made on the same basis. In order to do that, we need first the cost of pumping, which Mr. O'Shaughnessy has just given us, which amounts to \$360 per day for the 60 million gallons, excluding the cost of the pumping station, of course;

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now then, the one other thing that we need is the operating cost of the conduit line bringing the water to the city so that that may be capitalized, and added in the same way.

Mr. O'Shaughnessy: I cannot give you that offhand, I will have to compute it. 10,758

Mr. Metcalf: Mr. Hazen made use of the figures which had actually been shown on the Water Company's system here, amounting, as I remember the figures, to \$5 per million gallons daily capacity.

CROSS EXAMINATION BY MR. MCCUTCHEEN.

If the Hetch-Hetchy plant had been built on my plan "B", and was ready to deliver water in December, 1913, we would have had to create a market for the water, and would have gone about the creation of it by building distributing systems in San Francisco and Oakland. Assuming that we had the whole field, we would have sold possibly 60 million gallons a day out of 120 million gallons. The length of time it would have taken to make a market for the remaining 60 million gallons depends on the growth of the community and the demand for water. We would have had a plant, the operation of which was sufficient to provide a daily yield of 120 million gallons, but our income would be only on a basis of a sale of 60 million gallons, and that would be for a period of a great many years. I have made this estimate as to what it would cost to physically build those structures, and bring the water into this limit here. I presume this estimate gives the cost per million gallons at which you could bring the water into the city here. Whether you should divide that total cost by 60 rather than by 120 would depend on the market. Nobody would build a 120 million gallon plant if there was only a possible market for 60 million gallons. My plan would be plan "A" if we were to supply San Francisco alone, and assuming that we did not acquire the Spring Valley properties. 10,759

With the advent of pure Hetch-Hetchy water, the desire for water would increase in San Francisco; people would use it more abundantly, and I would expect the health of the city to be materially improved by an abundance of pure water. The consumption per capita now per day is about 85 gallons in the Spring Valley, and about 15 gallons from private wells, making an average of about 100 gallons. I computed my figures on the subject of consumption when the mountain water was brought in here at 100 gallons a day per capita, but I believe the consumption would be greater when the people appreciated the excellent qualities of the Hetch-Hetchy water. 10,760

I think my figures of 60 million to carry me to the date I say it would take me to are very conservative. In a well considered water project there is a safe reserve always to take care of a number of years. In determining what the actual cost would be of this Hetch-

10,761 Hetchy water to San Francisco, I have taken into account the actual physical construction for delivering water at the city limits, and the price per million gallons is based on that estimate. In this character of an estimate I did not think it was necessary to take that fact into consideration. Before I find a market of the last 10 million of those 60 million, the cost may be very much less than the figure which I have given here, because of the tremendous profits from our power development.

10,762 I remember the address I made to the Commonwealth Club in May of last year, and I think the point I meant to illustrate was that the acceptance of this offer of certain financiers to take all of the Hetch-Hetchy bonds, and pay for them possibly as the City needed the money, or to take them all and allow the City interest at a certain rate on the money until it was actually needed in the construction, would result in a financial loss to the City, and that we would do much better by selling our bonds as we needed the money, and by making one complete sale of all the bonds on the basis of $4\frac{1}{2}\%$ to a syndicate, and this syndicate practically have use of those bonds for a price of 2%. I don't recall any allusion to the detail of interest during construction.

10,763 I believe it was the other day that I first came to the conclusion that the power project would take care of interest-during-construction. I have stated several times the great value of the power product from our Hetch-Hetchy project. I never had occasion to put it into an estimate, in making an estimate of this kind, until the other day when I could utilize it. I went into figures very broadly for the purpose of determining the other day just what we could realize from that branch of the business; enough to know that the power product is of greater value than any interest-during-construction.

Referring to page 262 of Volume 10, for the year 1914, of the transactions of the Commonwealth Club, under the heading of "Electric Power Development", is the following: "An extensive study of hydro-electric power development possibilities has been made by an advisory board of consulting engineers. The Bureau of Engineering has adopted their recommendation that the plant be designed for an ultimate development of the first unit of power from 620 second feet of water, and that the ultimate plant should consist of six 12,500 kilowatt normally rated generators, operating on a load factor of 65%, capable of carrying a peak load of 76,300 kilowatts, and an average of 49,600 kilowatts, with two generators as spare units—half of the installation to begin as soon as possible.

10,764 By making a large storage forebay reservoir, at a site already acquired at Moccasin Creek, instead of a surge shaft, as outlined by Mr. Freeman, a much more effective power product can be obtained at this point. It is estimated that enough power can be developed here in the first installation of construction to save the \$230,000 a

year now paid for electricity to drive our municipal railways, and leave a substantial amount of power for other needs.

I have formulated a tentative time schedule for construction of the works to the city limits under the most optimistic conditions, and have compared the interest charges on the basis of this proposed scheme of financing, with the interest charges that would accrue under the ordinary plan of selling bonds as funds become necessary and I find that the charge for interest during the construction period under the ordinary plan, on a total construction cost for the Hetch-Hetchy Dam and Aqueduct to the city limits, of \$38,426,000, amounts to \$3,477,000, while under the other plan the City would pay $4\frac{1}{2}\%$ interest on the whole bond issue from the start, and receive only 2% on unexpended balance, making the entire charge for interest \$6,277,000, an excess over the former figure of \$2,830,000, or $7\frac{1}{2}\%$."

Mr. O'Shaughnessy: The quotation from my address which you have read does not prove that it had not occurred to me at the time I delivered that address that my power product would afford a sufficient revenue to compensate for the loss that would ordinarily result from interest-during-construction. The point of that quotation was to illustrate the cost of the different methods of financing, whether by making a complete sale of bonds at one time, and paying $4\frac{1}{2}\%$ continuously, or selling the bonds progressively as the work was constructed. The interest that I figured, as you will see from this exhibit, approximates very closely to the interest stated in that report. I would not expect to sell any of the water I brought from Hetch-Hetchy for any other than domestic purposes.

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The consumption in 1935 would be 79 million gallons per day for San Francisco alone. I have allowed for development expense in the cost of my Hetch-Hetchy plan. I have allowed nothing for going concern. I am making a report or an estimate of the actual physical construction of the cost of bringing water from one certain point to another point.

I think the cost of excavation for the Hetch-Hetchy Railroad is a little in excess of the cost of benching for flume purposes. The work on the Hetch-Hetchy Railroad was not all rock work, about 30% of it was rock work. We received bids on the rock excavation and on the earth excavation, both on the unit price basis for three classes of material, and also a flat price for all the material, and we found the flat price for all the materials, at 67 cents a cu. yd., was a little cheaper than the unit price, so we adopted the flat price. I was a witness before the Railroad Commission of this State, in which the Southern California Mountain Water Co. was a party, and there I testified with reference to the cost of construction, among other things. Bids on the Hetch-Hetchy work were received on three classifications, loose rock, solid rock, and earth; I have not the figures here with me. I

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know that the aggregate of the unit, and the quantities at unit prices, were in excess of the flat figure, and I adopted the flat figure of 67 cents instead.

Mr. McCutchen: Q. Mr. O'Shaughnessy, in this San Diego case it appears that Mr. Doolittle, representing the company, asked you this question:

10,770 "Q. Are there any other items you have in mind, Mr. O'Shaughnessy, on the construction work on the Morena Dam? A. Yes. "This question of rock excavation, there is 8,500 yards at \$1.50. My "price for similar work is \$2 per cu. yard, and I think also there is a "point that the commissioners' engineer should understand, that a lot "of this rock was excavated in small pieces from the adjoining moun- "tain side so as to wedge the face of the dam into the solid bed-rock, "and the cutting and excavation had to be very carefully done, much "more so than on railroad construction where you could put in large "blasts, and break off large masses of rock. Now, in connection with "that, I would say that the price of excavating rock in Arizona, along "the Santa Fe Railway was—the contract price was \$1.40 per cu. "yard on the widening of the double tracks through Arizona and New "Mexico, and Malapi rock they have there is not as hard as our "Morena rock."

Mr. O'Shaughnessy: A. That work was of an entirely different character from the Hetch-Hetchy Railroad work; it was much more difficult. When I say "rock was excavated in small pieces from the "adjoining mountain side so as to wedge the face of the dam into "solid bed-rock, and cutting and excavation had to be very carefully "done", the work I was describing was absolutely different from benching for flume. The excavation I alluded to was for the foundation of the face walls of the dam; they were cut into the solid ledge granite on both sides of the mountain. I built the spillway for the Morena Dam, but I do not remember what the cost was.

10,771 Questioned by Mr. Searls.

The city pays for its cement for the Hetch-Hetchy work now \$1.38 f. o. b. at the cement factory, and that includes sacks. I think that is the net price. I know \$1.30 was the first bargain I made with them, and I added additional sacks, and I think the price is now \$1.38.

RE-DIRECT EXAMINATION BY MR. SEARLS.

10,772 Prior to making my report in April, 1913, for the purpose of rate fixing that year, I instructed Mr. Ransom that we should conform to the previous reports filed. Each year the City Engineer's Office filed a report at the request of the Board of Supervisors, and those reports have been kept in a folder in our office. The report for the year 1913 was outlined on the same values as the report filed for the previous years, with additions. Judge Farrington's decision had to do with it, because he put a valuation on it which was used by us as a

basis. Each year the water company filed a statement showing the lands that were purchased, and the improvements they had made; those were added each year to the valuation of Judge Farrington, and the same basis for depreciation that Judge Farrington made was applied, and the result was put down as the valuation of our office.

At the time I was preparing the list of properties for the condemnation suit, I contemplated that up to the time the Sierra supply could be constructed, and water brought in here, that Merced would be put to daily use. The restrictions which I proposed for the use of Merced, that is, the boulevard and the protective work, were designed both in view of the present stage of development to the west of Twin Peaks, and in view of the stage of development which may take place west of Twin Peaks. I gave the more weight to the future development.

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When I stated that it was my understanding that prior to 1913 the Lake Merced lands had always been used by the company for the protection of the water supply, I meant that the company reserved the lands for the purpose of protecting the water supply, and in making that statement, I do not pass on the question of necessity.

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The additional strips which I have testified I intended to acquire at Pleasanton were for future development of the underlying gravel water supply. Assuming that the company has taken from its present well tracts an average of $7\frac{1}{2}$ to 8 million gallons, it is my opinion that the rights of the land owners to the east would have to be considered by the city in acquiring these strips to which I referred, before taking any more than that amount. Of course, they would naturally feel damaged, and would claim damages by the lowering of the water. If you put in pumps and speeded up the rate of withdrawal, the result would be that the water plane would lower very naturally, and they would naturally have claims and grounds for damages.

10,776

ONE HUNDRED AND FORTY-SEVENTH HEARING.

APRIL 28, 1916.

Witnesses: M. M. O'SHAUGHNESSY for Defendants.
GEO. L. DILLMAN for Defendants.

Witness: M. M. O'SHAUGHNESSY for Defendant.

RE-DIRECT EXAMINATION BY MR. SEARLS.

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Referring to "Defendant's Exhibit 206"; assuming that by the purchase of the lands at Pleasanton marked in red, and also marked in yellow, and also by the additional payment of \$1,000,000 for the settlement of water rights on the lands to the east and north of these

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tracts, you could gain the right to pump 20 million gallons from the gravels beneath the red and yellow tracts, I would say that the million dollars damages to the farmers would be excessive, and I would not recommend it. If the city were to go ahead with the condemnation suit, my recommendation would be that the land in the tracts marked in red and yellow on Map 206 be excluded and only the water rights acquired.

Questioned by Master.

It is my understanding that that acquisition of water rights would involve the right to lower the water table beneath the lands marked in yellow. The cone of depression of the table will extend slightly beyond the yellow lands, but it is my judgment from observation that the withdrawal of a certain quantity of water does not damage those lands for agricultural purposes, and I would take my chances on any suit for damages in that respect.

RE-DIRECT EXAMINATION BY MR. SEARLS.

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If the lands excluded from Lake Merced under my descriptions should have been sold off by the Spring Valley Water Co. prior to 1907, it would not have been necessary prior to 1915 to construct the structures which I designated as advisable in the proposed purchase plan, for the reason that the only possible use that the land could be put to by the new purchasers would be the present agricultural use of the present owners, or by the opening of the lands to settlement like the other suburban sections of Ingleside and St. Francis Wood, and in my judgment the uses of those lands for such settlement, with proper sanitary precautions would be less injurious to the water supply than the present uses of the land for intensified farming.

Questioned by Master.

We contemplate complete sewers, cast-iron pipe and lead joints in some places, and in some places ordinary sewer pipe. The ordinary sewer pipe is required everywhere, but in the vicinity of the lake region, cast-iron pipe would be used to carry the main sewage outside the shed.

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If you take the neighboring section, such as Ingleside, St. Francis Wood, and Parkside, which has been opened up for about 10 years, the settlement has been comparatively slow, and the number of houses comparatively limited, so that the amount of drainage and sewage to take care of is comparatively limited, and it is my judgment that far less nuisance would be created by such settlement than the present farming uses on this territory I have excluded.

Mr. Searls: I have procured the bids for the work of Hetch-Hetchy from the City Engineer's official records, and they are as follows:

This first list was on the road from the Hog Ranch into Hetch-Hetchy Valley; it was built by the Utah Construction Co. in 1914.

SPRING VALLEY WATER CO. VS. CITY AND COUNTY OF SAN FRANCISCO

July 8, 1914, bids were received. They were as follows: For all material, 155,000 cu. yds.: The Shattuck Ettinger Co., \$1.74; Mahony Bros., \$1.30; Robert C. Storey, \$1.45.

For the segregated materials: Earth, 39,000 cu. yds., Mahony Bros., 55 cents per cu. yd.; Utah Construction Co., 40 cents per cu. yd.

Loose rock, 31,000 cu. yds.: Mahony Bros., 75 cents per cu. yd.; Utah Construction Co., 68 cents per cu. yd.

Boulders, 15,000 cu. yds.: Mahony Bros., \$1.10 per cu. yd.; Utah Construction Co., \$1.30.

Solid rock, 69,000 cu. yds.: Mahony Bros., \$1.70; Utah Construction Co., \$1.30.

Cemented material, 1,000 cu. yds.: Mahony Bros., \$1.70; Utah Construction Co., 68 cents. Those last two bidders were the only ones bidding on the segregated items. The remainder of the bid is for culverts and other matters which are apparently not relevant here.

As to the grading for the Hetch-Hetchy Railroad, bids for which were received November 24, 1915, and under which S. Rolandi was the successful bidder, and is now prosecuting the work; the following bids were received:

For granite: Porter Bros., \$1.17; S. Rolandi, \$1.05; McArthur, \$1.23; Utah Construction Co., \$1.30; Twohey Bros., \$1.36.

Solid rock: Porter Bros., \$1.07; Rolandi, 94 cents; McArthur, 80 cents; Utah Construction Co., \$1.20; Twohey Bros., \$1.36.

Soft rock: Porter Bros., 69 cents; Rolandi, 70 cents; McArthur, 45 cents; Utah Construction Co., 70 cents; Twohey Bros., 75 cents.

Earth: Porter Bros., 38 cents; Rolandi, 37 cents; McArthur, 30 cents; Utah Construction Co., 33 cents; Twohey, 36 cents.

Proposition No. 2, giving a unit price for all of these materials: Porter Bros., 79.4 cents; Rolandi, 67½ cents—which was the figure Mr. O'Shaughnessy gave—McArthur, 62½ cents; Utah Construction Co., 93 cents; Twohey Bros., \$1.04.

Mr. O'Shaughnessy: In the Richmond District, Sunset, Excelsior Homestead, Bernal Heights, and numerous other portions of the city suffered for lack of water supply during the year 1907 to 1915. The supply was insufficient in possibly 25% of the area of the city.

Regarding the price of cement for Hetch-Hetchy, the contract with the Santa Cruz Portland Cement Co. was for 3,175 barrels, at a cost of \$10,613.25, delivered at Chinese. This is equivalent to \$2.67 per barrel. The freight at Chinese is governed by the Sierra Railway Co., and is 88 cents per barrel in carload lots, making a price per barrel at the mill of \$1.79, on which there is a rebate of 40 cents for the four sacks, making the net price at the mill \$1.39 per barrel.

Questioned by Mr. Greene.

We did not have any special freight rate. We paid the regular tariff rate, and the Cement Company did, too.

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RE-CROSS EXAMINATION BY MR. MCCUTCHEN.

I stated that 25% in area of the city was affected by insufficient water supply, but if you were to consider it from the standpoint of consumers its percentage would be possibly not over 10%, and I do not think that is an exaggeration; take the Richmond section alone; there are over 40,000 people living in that section, and there has been a general shortage of water all through there.

Questioned by Master.

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It was a question of pressure, and of commodity. The pipes leading there were too small, and when the peak draughts came in the morning and evening, there was not adequate water to supply the houses. With sufficient pipe and sufficient pressure the need would be relieved. There has been recent construction in the last year which has relieved those conditions. That construction is practically completed. Of course, the general policy of the company in such a district as the Richmond District, in laying very small mains through the streets, is not desirable for first-class waterworks construction, because the mains are not large enough to furnish any fire protection. The new mains that have been laid have been principally leaders to the existing smaller mains. There has been a 30-inch main laid across Golden Gate Park from Laguna-Honda Reservoir. In that way the system has been fed by larger mains, but the general average of the pipes throughout that section are of very small diameter.

RE-CROSS EXAMINATION BY MR. MCCUTCHEN.

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I know that there has been a material increase in the consumption in the Richmond District since those larger pipes were installed. During the shortage, people who reside on the higher levels, as soon as the general draught diminished, were able to get some water at certain hours of the day or the night. Some of them put water in bath-tubs, and various vessels, to tide them over the dry period. I have never made any investigation for the purpose of determining how the consumption, after the larger pipes were installed, compared with that before, any more than looking over the monthly reports of the company, and I don't remember the exact details of what they show.

All of the reports of my predecessors, the Board of Supervisors, in rate-fixing proceedings, treated all the Lake Merced lands of the Spring Valley Water Co. as in use for the purpose of supplying San Francisco and its inhabitants with water. I think it was in the fall of 1912 that I became familiar with the fact that some of the Lake Merced lands were being used for intensified farming. At any rate, I knew that before I made my report of April, 1913. I also knew at that time that all of the income which the company derived from such use of the lands went into its general treasury, and I also knew that the consumers were getting the benefit of that income. Knowing

this, I did not recommend, in my report to the Board of Supervisors, that the company be given some compensation that would relieve those lands from the agricultural use to which they were being put, because I did not notice the aggravated condition of the lake supply, until a later date, due to the influence of this farming. I think I noticed that first in 1914, my attention being called to it then by the filthy condition of the water in the north lake. 10,789

I regarded the custody and the protection of the character of the water, the function and the duty of the company, and I did not feel it was necessary to direct the attention of the city officials to it. The principal reason for not doing it was that I didn't care to advertise it to San Francisco that such water was being put into our system. I was influenced in withholding that recommendation to the Board of Supervisors because of a fear that if I did make the recommendation, that the revenues of the company from water sales should be increased by the Board in order that the Lake Merced lands might be relieved from that use, it would reflect on the City and County of San Francisco. 10,790

I believe I discussed the matter informally with the Mayor. I did not recommend to him that the rates be increased in order that the land might be relieved from that use, but I explained to him the cupidity of the company in starting farming operations immediately on the edge of the lake, and putting manure on it, with the great danger of contaminating the lake for the sake of the small rental they would get out of it, and endangering the character of the water thereby. I did not think it was a logical policy. The company had been allowed those lands in previous years for rate-making purposes, and the policy, and the care, and so on, of the lands, was the duty of the company. I believe it is fair to say, taking into consideration what I knew about that property at the time of my report to the Board of Supervisors, in April, 1913, and being in a position where I could make a recommendation which the Board of Supervisors might have adopted and acted upon, that it is fair to take the position now that those lands were not in use, because the company was using them for farming operations. That answer expresses my views, theoretically, notwithstanding the fact that but for those farming operations, in my opinion, the lands would have been in use for water producing purposes. I used the word "theoretically" to qualify my answer in this respect: When I came in contact with this problem of sanitation around the lake, I was prevented in 1890 from building a race track near the Sloat Boulevard, a long distance north of the north lake, notwithstanding the greatest provision was being made for sanitation and drainage, because the company felt that no filth or animals of any kind should be on the territory near the lake, and it very much impressed me with the purpose and the high motives of the company at that time to preserve the water in a state of purity, but with a 10,791

10,792

reversal of policy, and the utilization of the lands for intensified farming, and putting manure there where the drainage and the rain would naturally wash it in, I did not think that the policy of the company was consistent.

10,793 In 1890 the lands were considered in use for water producing purposes by the managers of the company, and I believe by the city, and also from my understanding. That understanding came from actual contact with the proposition of polluting the ground in the vicinity of the lakes. By water protection I meant a sanitary protection of the lake water, and to that extent, in 1890, they were so operated. I
10,794 draw a distinction between "operated" and "used". Operation is the working of a property, but a water company, for instance, might operate a pipe-system, and someone might use it. The company was operating those properties out there for protective purposes, and the public was using the commodity that came in an unpolluted character, due to the operations of the company. That was the manner in which this property was operated in 1890. Up to the time the farming operations began, no change whatever, to my knowledge, had been made in the use of that property for water purposes. That is to say, up to the time that the intensified farming began, the property was used ostensibly for water protection purposes. I think that a very wise
10,795 policy would be observed by the old owners of this property in accumulating a lot of lands, which, with the extension of time came to have a very high speculative value, and more especially if those lands were carried for them at the expense of the rate-payers as a part of a water system. My inference would be that the lands I saw in the Merced Tract were partly in use for water protective purposes, but largely in use as a property reserve. That was not my thought about it in 1890.

10,796 I think after I assumed the office of City Engineer I went over the previous records of transactions between the company and the city as to the various offers and the terms of sale. I noticed, I think, in 1909 and 1910, the company made offers to sell to the city their water plant, excluding all lands but 500 acres around the lakes, including the lakes, however, and that naturally directed my attention to an investigation as to the quantity of lands it was desired to reserve around the lakes. After my investigation I thought a larger area of about 1,000 acres was desirable. I did not know about that prior to the time I made my report of April, 1913. The city's declared policy since 1901 has been to bring in a Sierra supply, and I knew that all of that discussion was with reference to bringing in another supply, and the elimination of Lake Merced, except as an emergency supply. That developed the thought in my mind as to the quantity of land that was absolutely desirable or necessary for protective purposes around that lake, with or without a Sierra supply.

If this supply were to be used for all time, I would be satisfied to use it with the protective measures that I have recommended here, and no others. I would be satisfied to use it under those conditions as a daily source of supply. 10,797

My judgment is that these lands have been partially in use, and that partial use still continues. When I say "partial", I mean part of the total area of Lake Merced, and when I say part of the total area, I mean that these 811 acres is the part now in use, and has at all times been used since I have known the property. At no time within my knowledge of the property has any other portion of the Lake Merced Ranch been in use as a water supply. It has been used for farming purposes, and I do not consider it has been in use for water supply purposes. The area outside of the 811 acres was fenced in and ostensibly used in connection with the water supply of San Francisco prior to 1909. When I say ostensibly used, I mean with the apparent necessity for so using it, but it was not necessary. I think that lack of necessity existed for many years prior to 1909. It is my impression that a great part of it, except the 811 acres, was never in use for the purpose of supplying water to San Francisco. I said that the policy of the company in keeping the lands clean for a water supply was consistent, but that the utilization of the lands for intensified farming was inconsistent with their utilization as a watershed. 10,798 10,799

Questioned by Master.

Taking the year 1914, for example, and assuming that it was all wild flowers, without any human habitation; in other words, in a condition comparable to the watershed down at Pilarcitos, under those circumstances I would likewise exclude from the property in use everything outside of the 811 odd acres that I have referred to, and if, at that time, the company had sold off all of that outside acreage, it could not be criticised for so doing in line with its duty to keep the water supply in good shape. 10,800

RE-CROSS EXAMINATION BY MR. MCCUTCHEN.

Referring to the Pleasanton properties, I would pay \$1,000,000 to get 10 million gallons of water. That is to say, I would be willing to pay \$100,000 per million gallons for the water alone for the additional 10 million gallons. 10,801

I first got the information that induced me to change my mind with reference to the yield of the Pleasanton gravels, in the spring of 1914, but I did not get complete data until May 31, 1914. I was never under the impression that these gravels would yield 72 million gallons daily. Professor Lawson made that statement in his report, published by the Spring Valley Water Co. in "The Greater Water Supply for San Francisco". These exaggerated statements, made by the company's representatives, got me investigating and thinking over 10,802

10,803 this subject that there might be some element of truth in the foundation for their statements, and I wanted to satisfy myself and make an impartial analysis, and get the actual facts. This statement of 72 million gallons daily was published in a report which was filed with the Secretary of the Interior in 1912. I made a report on that subject about the same time.

I recall the following statement in a report made by me, addressed to the Honorable Secretary of the Interior, and the Advisory Board of Engineers U. S. Army, San Francisco Water Supply Investigation: "It is therefore quite evident that the yield of the three drainage areas just mentioned is, by the first rough computation, about 38 million gallons daily, and by the second computation, based on Mr. Duryea's figures, consistently less than 48 million gallons daily, or say about 40 million gallons daily, and the yield from the Alameda gravels, as above noted, about 15 million gallons daily, would give the yield of the Alameda Creek system of the Spring Valley Water Co. as at the very outside about 15 million gallons daily."

10,804 When I spoke of Alameda gravels here, I believe I meant both Sunol and Pleasanton combined. This report is of date February 6, 1913.

10,805 I have stated when I made my report in November, 1913, I did so because I labored under an impression which I did not labor under in February, 1913; there was a second station that was installed by the company at a higher level than the old station at Pleasanton that was supposed to increase the supply, and the working of that station had not been thoroughly proven. I believe large expectations were based by the company on the operation of that station increasing the supply, but the result shows that when that station was operated, water was withdrawn from the lower station so that the united water withdrawn from the two stations was very little more than had been withdrawn before. This report of February, 1913, referred to the measured output. That is, I mean the company's average development from the Alameda side did not average up to that time over 16 million gallons a day.

10,806 There is no information I got from the company that mislead me about anything, because I made my original measurements with my own assistants entirely independent of any information furnished me by the company. In making my report of November, 1913, to the Board of Supervisors, as to the advisability of acquiring these Pleasanton lands, I was laboring under lack of information; our information was not at all developed. As I told you, the complete report of our analysis was not made until May, 1914. Our attorneys desired me to exclude that land from inside the condemnation limits, and I declined to do so for the reason that I was in doubt as to the operations of the alleged artesian belt. I had not changed my mind subsequently

to February, 1913, when this report was made, and before November, 1913, as to the value of these lands for water producing purposes. In November, 1913, my information was not complete, but in February, 1913, it was as complete as it could be made with the data that was available. I had no reason to form a conclusion in November, 1913, until all my investigations and reports and analyses were completed. It is not correct to say that nothing had happened between February and November, 1913, to change my view with reference to the yield of those gravels. 10,807

Within a mile of Livermore there was a drop of 50 feet in the water table in Well No. 177; down near Pleasanton a drop of about 20 feet. 10,808-09

(Counsel for Defendants admitted that all land rentals received by the company were reported to the Board of Supervisors, and shown to be part of the company's income, and so considered by the Board in fixing rates from year to year, and particularly for the years in controversy.) 10,813

Questioned by Mr. McCutchen.

Mr. O'Shaughnessy: With reference to the Hetch-Hetchy work, the cost of which I have referred to—the 67-cent work—teams were used to some extent for the excavation of the road. You could use teams on benching for flumes, and you could do that to a certain extent on the Spring Valley flumes. I think there is a flume from the Crystal Springs Dam up to San Andres on open ground that would be accessible to teams. Whether I would use scrapers there would depend on the detail of the ground.

(A copy of testimony of Robert Higgins, who testified in the last case on the methods of construction used at a number of the Peninsula properties, and also the original unit costs, was introduced and marked "Defendants' Exhibit 211". This offering was made by Counsel for Defendants with the understanding that Counsel for Plaintiff has a right to object to the legality of any of the evidence he desires to.) 10,815

(It was agreed between Counsel that after a careful examination and analysis of Mr. Park's estimate of his return from the stock business on Calaveras lands, as based on his books, they were unable to draw any conclusions from the books as to revenue or expenditure, or otherwise.)

Witness: GEO. L. DILLMAN for Defendants.

Dillman

DIRECT EXAMINATION BY MR. SEARLS.

10,816

With reference to Sunol Tunnel No. 2, I went to E. B. and A. L. Stone and got a copy of a letter which they had made for the Spring Valley Water Co. at Mr. Eastman's request. In examining it I found that the quantities did not correspond to that tunnel, there-

fore I was dissatisfied with it. Upon further examination I found that the prices were correct; the contract was for an adjacent tunnel on the Western Pacific known as a small tunnel in the Niles Canyon.

10,817 The statement which is from the books of the E. B. and A. L. Stone Co. for prices for that tunnel work is definite. It is the small tunnel on the Western Pacific and the Niles Canyon. The contract was let during 1905, and the work prosecuted during the early part of this period in question.

10,818 The transcript I have here was made from Stone's books by a stenographer and you have a copy of the same letter. It has nothing to do with the tunnel under discussion, but shows definitely the prices paid for tunnel work in detail at that time. It is a contract that was let in 1905, and the work was prosecuted for several years after, under this contract. It represents the cost at which work was let and executed at the time; to that extent it seems to me to be pertinent. The contract was let in 1905, and the work prosecuted until 1908, I think.

The letter from which I intended to read is a copy of that which was sent to you from the E. B. and A. L. Stone Co., in response to your inquiry on that subject.

I was informed by Mr. Stone that a copy was given to Mr. Eastman at his request.

10,819 (The matter of the Sunol Tunnel costs was postponed for further discussion until Monday, May 1st.)

ONE HUNDRED AND FORTY-EIGHTH HEARING.

May 1, 1916.

Witnesses: GEO. L. DILLMAN for Defendants.

N. RANDALL ELLIS for Defendants.

10,820-23 (Counsel for Defendants entered objection to the admission and consideration by the Court of any testimony going to the past actions of the Rate Committees of the Board of Supervisors, or the City Engineers, other than Mr. O'Shaughnessy, who testified, himself, in the matter of inclusions or exclusions of the property of the company. It was decided by the Master to reserve a ruling upon the objection, and that Counsel should produce the evidence.

Counsel for Defendants then stated that it is a fact that the previous reports of the City Engineer, and the Rate Fixing Committees, allowed all of that property, including the Merced lands, in making up their valuation.)

10,824 Mr. Greene: I am going to object to the introduction of the memorandum that Mr. Dillman let me have on Friday. There were three tunnels built on the line of the Western Pacific Co., by E. B.

& A. L. Stone Co., all under one contract. The figures that are given in that do not agree with the figures which appear on the Western Pacific's books, and there are various side considerations which have to be taken into account. I am willing, if Mr. Stone can come and explain these figures, to accept his figures as far as they agree with the Western Pacific's, or I am willing to have you have some one go through the Western Pacific's books with us, and get the figures for the three tunnels, but as far as I can get at it, that information is not entirely accurate. That is, as far as the E. B. & A. L. Stone contract is concerned. So far as the sub-contract is concerned, there is no information there which shows what the actual cost paid by E. B. & A. L. Stone Co. to the sub-contractor is. The material and equipment is not covered there. I asked the Western Pacific today if they had it, and they said they did not have it. I asked Mr. Stone if he had it, and he said he did not have it. I have explained as fully as I can the character of the objection; I am perfectly willing to meet you on any common grounds and get the information, because if you think the information is helpful, you are entitled to get it.

10,825

Questioned by Master.

Mr. Dillman: My valuation for the Positas water rights was \$75,000, and \$25,000 for Mocho water rights; the Positas water rights were developed, and the development was at a fairly low cost; while the Positas Springs will not produce as much water as the Mocho, the higher value per unit put on that water supply is undoubtedly largely based on the cheap cost of its development.

Questioned by Mr. Searls.

Mr. Dillman: With respect to my reservoir values; at Crystal Springs the equivalent compound percentage which should be added to the original cost to give the appreciated cost would be 3%; at San Andres 2.6%, and at Pilarcitos 2½%.

10,826

(Dillman's summation of Defendants' case introduced and marked "Defendants' Exhibit 212".)

(Tables to accompany Dillman's final summation introduced and marked "Defendants' Exhibit 213".)

Witness: GEO. L. DILLMAN for Defendants.

Dillman

DIRECT EXAMINATION BY MR. SEARLS.

Table 1 is an estimate for reproduction cost of structures, with overhead, interest-during-construction, less depreciation, and a very large addition for possible allowance that the Master may make over and above my original estimate. In this the structures outside of the city are estimated at \$6,486,000; structures inside of the city at \$6,821,000, to which is added \$26,000 for miscellaneous items taken from addenda by Dockweiler to the inventory. They amount to something over \$36,000, to which has been applied the average depreciation of

10,827

the other structures, reducing it to the amount given in Table 1. This makes a total of \$13,340,700. I do not think that these addenda at \$36,000 are the same items which Mr. Hazen referred to in the amount of about \$12,000. The cost figures are mine, and the quantities and descriptions are Mr. Dockweiler's, and it says here that the information is from W. B. Lawrence at Millbrae, July 23, 1914. There are nine pages of those miscellaneous items. Probably Mr. Dockweiler made corrections right in the inventory. From this are deducted: 1. Pleasanton ranch houses neither used nor useful. 2. Pleasanton drainage canals. These are neither used nor useful. In fact, the canals are really detrimental to water production. They help make agricultural land out of swamp land. Independent of the relation of the ranch land to the water rights the houses and drainage canals have no pertinence to the water supply of San Francisco.

Alameda pipe line paving was done after the pipes were laid, and is properly deducted here.

10,828

Ravenswood Wells, estimated with a net value of \$30,800, have no use in this water system, never have been in use, and due to the local conditions in the community about Ravenswood, it seems probable that the company never will be able to use them for supplying San Francisco.

There is a deduction of \$10,120 for transbay fences. These are fences that were estimated on lands not used or useful on Arroyo Valle, San Antonio, Alameda, and Calaveras Creek lands.

There is a net difference on agreements of \$168,518, which is put in these deductions. The big item in the deductions is for the pavements in the city, which is from an agreement between Counsel as to cost of reproduction, and to which I have added my overhead, and deducted my depreciation, making a net deduction of \$946,095. These total deductions reduce the estimate of structures to \$11,994,532. This item of net difference on agreements refers to agreements exclusive of the paving over mains, and the result of those agreements was a reduction from my figures of \$168,518.

10,829

To cover all possible contingencies and allowances which the Master may make, I have added to this estimate \$1,000,000 and a little bit more, to round out the figures for the structures in use as of December 31, 1913, to \$13,000,000. This addition is made, not to correct my former estimate, but to allow for additions which the Master may make in assuring a fair rating base. Should these additions, however, make the aggregate amount over \$13,000,000, it would be exceeding anything that I could honestly justify, and, therefore, I do not intend this allowance to extend that total beyond the sum of \$13,000,000.

Table 2 is a table of development of structures from this \$13,000,000 as of December 31, 1913, with new construction and depreciation considered. The second column shows the amount spent on new

structures, exclusive of Calaveras structures, which, in my opinion, should not be included in the rating base until they come into use. The third column the amount of depreciation according to my estimate of depreciation in 1913. I consider that depreciation based upon gross revenue is probably nearer right than a depreciation allowance based on any other part of the estimate. Whether, upon further examination, my percentage of $7\frac{1}{2}\%$, or Hazen's percentage of 8.45%, or some other percentage is right, I believe that the future will prove that the depreciation of waterworks structures will vary almost directly with the gross income upon proper rates. Column 4 is the net increase or decrease annually of the amount spent on structures, and depreciation of structures figured on the straight-line basis. This is simply the difference between two and three, one way or the other, sometimes plus and sometimes minus. Column 5 is the total for the structures for the fiscal year. Column 6 is population, and Column 7 gives the amount of structures in dollars per capita. This is not specially pertinent to the present financial figures, but corresponds to a column given in Mr. Hazen's Exhibit 164.

Due to the failure of the company to make the much needed extensions, the amount spent on new structures has been less than the estimated depreciation, so that the value in 1914 is less than in any previous year of this period. This is a further proof that the plant is under-built, as total for structures should increase with the growth of population.

10,830

Table 2-B takes up the eliminations made by J. M. Bailhache for operation as a capital charge, and adds that into the amount spent for new construction for that year.

Table 3 is a table of lands, rights, and working capital, as of December 31, 1913. The property in San Francisco has an agreed valuation of \$1,166,686, exclusive of Lake Merced. From that has been deducted the following lands:

The north, or unused part of Francisco Street Reservoir Tract, Parcel No. 382, \$41,250. This tract was also excluded in the condemnation suit, and is not in use for any purpose.

By agreement there are certain tracts, 471, 454, 493, 494, 432, and 491, being shown on Maps S-2, S-4 and S-5, amounting to a little over \$150,000, making the net San Francisco properties \$974,042.

10,831

(Counsel for Defendants advised that Dillman's use of the word "agreement" means that the segregation is Mr. Metcalf's and Mr. Hazen's.)

The Merced properties in use have been estimated at \$1,310,715, using Paschel's valuation. To this I have added for the Ocean View pump lot which was not included in the above figure, \$15,285, making a total of \$1,326,000. Based on Mr. Paschel's figures, this would allow in excess of 5 or 6 acres for the use of those pumps; exact acreage of land I have not sought to obtain further. The odd number of dollars is

10,832

taken so as to bring the total allowance for Merced properties out an even figure, \$1,326,000. The excluded Merced Ranch lands are property excluded. They are not used, nor had they a useful purpose in connection with this water supply. They constitute a very small area of the watershed. They are not used in a way to lessen pollution, but rather to aggravate, and while some use might be considered to be more detrimental to the purity of the water, in my opinion the lands used for residential purposes, if proper sanitation surrounded the buildings, would not be as detrimental as the present use for farming purposes with the great amount of land manure that is annually hauled there. Being within the city limits of San Francisco, there is no question but that the present municipal regulations with respect to building construction would be so enforced as to prevent any pollution due to the small residential development that might have taken place in this section during the years in controversy. If concrete or clay-pipe sewers were found to be unsafe, due to leakage, there is no difficulty that I can see in enforcing cast-iron sewer construction. In fact, I am informed that one cast-iron sewer for carrying the sewage of Ingleside Terraces away has already been constructed within the limits of the Merced Tract.

Regarding pollution of ground water supplies by adjacent dwellings, I would note here that the City of Alameda has a great many wells which produce good water—freer from organic pollution than that furnished by the Peoples Water Co. If the water coming into Lake Merced is not sufficiently purified by natural filtration through the sand of that basin, the possession of the land outside of the area considered by me necessary for the protection of the drainage works is of no use to this water.

10,833

Peninsular watershed lands are estimated, as valued by Mr. Smith, at \$1,605,013. I have accepted his valuation, but have added thereto the amount of \$159,370 for excess value of reservoir lands over his figures, making the total \$1,764,383. Out of these lands I have deducted, according to agreement with the Spring Valley. I agreed with Mr. Hazen's segregations, in those items at least—Parcels 28, 43, 101, 29, 33, 128, 138, and portions of Parcels 194, 195, 208, 205, 210, and 211, amounting to approximately \$96,000, also portions of Parcels 62, 90, and 91, which were excluded in the condemnation suit, and upon which rights of way and riparian right values have been allowed by McDonald and Lee. These parcels are in San Mateo Creek below the Crystal Springs Dam. These total deductions amount to \$129,709, leaving a net value of Peninsular watershed lands of \$1,634,674. That also includes the reservoir submerged land.

The San Mateo pump tracts and rights of way are estimated by Mr. Smith at \$166,118. From these have been deducted by agreement with the company Parcels 214, 215, 216, 32, 139, 186, and 197, amounting to \$7,800, and Parcels 35, 127, and 180, etc.—which were not by

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agreement—estimated as rights of way, amounting to \$42,381. These parcels are shown on Map 8. Total deductions from these lands amount to \$50,183, leaving a net value of pump tracts and rights of way in San Mateo County of \$115,935. Very properly a large portion of the Silva Tract, and the Millbrae Reservoir Tract should have been deducted, but as I was informed the right of way was not estimated there, I have left it in, and while it is a large amount, and excessive for the uses put to, it is in the direction of liberality to the Spring Valley Water Co., and will go to compensate for errors in real estate valuation.

10,834

The Alameda pipe line real estate was estimated at \$35,358. This includes the Belmont Tracts, Parcels 158 and 95, and Parcel 154 at Ravenswood, the balance of the Ravenswood lands being excluded except for McDonald's right of way valuation.

Well's Tract at Pleasanton is valued by Callaghan at \$463,856. I have accepted Mr. Callaghan's values for all Alameda County lands, and they agree very closely with Mr. Parson's.

Laguna Creek lands are estimated in toto at \$60,410, comprising parcels as shown on Map 12, numbered b-239, w-239, 261, 262, and 290. Out of these I have taken a portion of the Nusbaumer Tract, which was excluded in the condemnation suit, at \$40,769. This land is excluded as not pertinent to the operation of the water plant. The surface water from that part of the system needs the filtration which it gets at Sunol before it can be used anyway.

The lands of the Sunol Basin in use are estimated at a total of \$451,516, and terminate at the easterly boundaries of the De Saisette and Hadsell properties. From this I have excluded the Stone Tract, except the portion of it which is estimated in water rights, as being not used or useful, and only pertinent as water rights, \$35,165, making the estimate for the lands of the Sunol system \$416,351.

The Arroyo Valle, San Antonio, Alameda and Calaveras lands are not considered as used or useful in this estimate, except in connection with an additional allowance of approximately \$1,500,000. Were these lands in other ownership, the water production would not be affected. Were they put to other use which might pollute the water beyond the ability of the Sunol filter bed to purify, such pollution could be stopped by injunction or by special police officers employed by the company, and acting under the State law prohibiting the pollution of domestic water supply. These lands are naturally grazing and grain lands, and their use as such would not be different from their present uses in the ownership of the Spring Valley Water Co. The water from all of these lands is filtered before it passes through the conduits, and then comes into storage in San Francisco in the distribution reservoirs. I understand that a value for all these water rights has been allowed.

10,835

The Pleasanton ranch lands are excluded for the reason that that portion of the value of the Pleasanton ranch lands which is ascribable

to water rights has been valued separately by Mr. Lee, and included in the water right valuation. I find no utility beyond this right in the lands in supplying San Francisco with water. There was no justification in the original purchase of the land from a water supply standpoint when the company had the right to condemn the water rights separately, although it may have been good business to do so from the standpoint of a real estate investment.

10,836

Rights of way have been valued by McDonald at \$272,730, from which deductions of \$66,224 are made on account of duplications of real property valuations and rights of way out of use, as shown on Table 1, leaving \$206,506. I have accepted this valuation. At the same time, I have not made any deductions in years prior to 1913, according to the stipulations between attorneys, because it is a small matter anyway, and nothing is more doubtful in an original estimate than cost of rights of way. Furthermore, I don't know how much of the valuation is ascribable to severance and damage, and there clearly would be no appreciation or depreciation of such elements for the years succeeding or preceding 1913.

Water rights have been valued by Lee, and I have accepted his valuations at \$1,932,989.

Working capital I have placed at \$400,000, which includes about \$300,000 for stock on hand which has not been included in my structural inventory.

10,837

This makes a total of \$7,525,352. To this I have added for all errors and omissions in realty values \$1,000,000, and as an estimated valuation of whatever elements of protection to the purity or the security of water supply, the ownership of large areas of watershed lands in Alameda County, the Merced Ranch, and the Pleasanton Ranch lands, may be found to afford the streams or water rights as well as the strategic advantage, if any exists, of owning the dam-sites at the various reservoirs, the sum of \$474,648. This peculiar amount in the small and insignificant figures, when added to the previous figures, makes that portion of the rating base, including lands, rights and working capital, an even \$9,000,000. If the Master should disallow the deductions of watershed lands in Alameda County, or Pleasanton Ranch lands, I should consider that proportionate deductions based on the relative acreages of allowed and disallowed exclusion, should be made from this \$474,648.

In making that allowance, I considered that it would not be unreasonable to allow for a strip of land protected by fencing along the strip through lands of the Spring Valley Water Co., or other lands which might be appurtenant, and while all this water gets filtration, and probably needs filtration at Sunol, or through the well production at Pleasanton, this is certainly ample to allow for reasonable protection, should it be considered necessary. That protection is not necessary now, but possibly would have been necessary now, or in the past,

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had the lands been in alien ownership. It may be necessary in the future, of course.

Table 4 shows development of lands, rights and working capital, based on the foregoing value, as of December 31, 1913, \$9,000,000, in which the purchase of lands used and useful are applied, and also the percentage increase of, or decrease in value of lands according to the stipulation between attorneys of March 14, 1916. In making these additions and betterments, I have followed the principle that if the company bought new lands in Calaveras they were excluded, or if they bought the Pleasanton lands, they were excluded in the year 1911. The second column shows the lands purchased that were used and useful. The third column shows the amount of increase in value according to stipulation of the parties, and working both ways from the value of \$9,000,000 in 1913, the figures in column 4 are gotten.

10,838

Table 5 is an estimate of population, consumption and gross revenue for the period covered by this suit. Column 1 is the fiscal years beginning July 1st. Column 2 contains the population, which is taken from Hazen's exhibit without change. Column 3 is the consumption in million gallons daily for the corresponding year. Column 4 is the gallons per capita daily consumption in San Francisco, which low consumption is partly accounted for by the inability of the company to supply the demand for water. The next three columns are gross income as found from the books of the Spring Valley Water Co., and reported by Bailhache. Column 5 is income in thousands of dollars. Column 6 the dollars per capita, and column 7 the dollars per million gallons gross return to the company, or cost to the consumer.

Table 6 is one showing gross revenue, operating expenses, depreciation and net revenue. The first column is fiscal years beginning July 1st. The second column is gross revenue. The third and fourth columns are operating expenses and taxes, as reported by Bailhache from the company's books, column 3 being expressed in percent of the gross receipts. Column 5 shows the operating revenue which is gotten by subtracting column 3 from column 2. Column 6 is the annual depreciation allowance on structures used and useful. Column 7 is the net revenue, being the difference between column 5 and column 6. The depreciation allowance of \$250,000 was the one that was derived from my estimate in the inventory after subtracting the properties that were excluded by agreement as out of use. There is no difference in the percent of depreciation, because in making these deductions the depreciation was deducted as well as the valuation. Since making this table I have learned that the agreed excess of collection over earnings rate is \$250,000 for the fiscal year 1907-08. If that deduction be made, the resulting net return for 1907-08 would be \$715,000 instead of \$965,000.

10,839

Table 7 is the combination of structures, lands, rights, working capital, into a rating base. Column 1 is the fiscal years. Column 2

10,840 is structures taken from Table 2 of this exhibit. Column 3 the lands, rights, and working capital, taken from Table 4 of this exhibit. Column 4 is the sum of Columns 2 and 3, and represents the rating base for the different fiscal years. The net income is taken from Table 6, and the final column, 6, is the percent of return on this rating basis. With respect to the year 1907-08 the deduction is \$250,000 from the net income, leaving the income \$715,000 instead of \$965,000, would alter the percent of return on the rating base from 4.6% to 3.4%. Table 8 is added to show what the net income would pay return on as a rating base when the interest is computed at 5, 6 and 7 percent. Table 9 contains the details of duplications of McDonald's rights of way, and the Sunol lands valued as real estate. It simply affects my deduction in the real estate valuation. Column 4 is the amount taken as a rating base in the years in controversy, as follows:

1907-08	\$20,675,000
1908-09	20,753,000
1909-10	20,815,000
1910-11	21,208,000
1911-12	21,510,000
1912-13	21,970,000
1913-14	22,000,000
1914-15	21,964,000

Taking Column 6, the percent on the rating base of 1907-08 will be 4.7%, or 3.4%, according as the \$250,000 estimate is left or deducted.

10,841 1908-09, percent on the rating base 6%,
1909-10, return on the rating base 6.7%,
1910-11, 6.9%,
1911-12, 7.6%,
1912-13, 7.5%,
1913-14, 7.5%,
1914-15, 7.7%.

I have added nothing for going concern.

10,842 When business is started it is always with some kind of preliminary estimate as to outcome. This business, once established, becomes then a going concern; all doubts as to costs have been solved, the cost of operation and returns are being ascertained, though both of these may change materially from time to time from a great variety of reasons. If the returns are inadequate, the loss is ordinarily pocketed, but should the business turn out more profitable than was expected to bring just interest returns on the investment, then this added value which brings returns is generally called going concern values. Sometimes it is very substantial; sometimes it is considerably more than the original capital. Value of a well-advertised

brand is oftentimes many thousands of dollars. Its cost is represented in cost of advertising, but its value is not commensurate with anything else in the business.

This estimate is based on the assumption that reproduction cost is a measure of value. The prices put on are the prices of a going concern, otherwise there would be no connection between value and cost, or cost of reproduction. The real value would be second-hand and scrap value, so that from this viewpoint going concern is a very large percentage of the valuation here made. To add this, or any amount, to this estimate would be duplication.

There is some initial cost in establishing a business, which on the books can be segregated as deficiency of revenue expected, but this cost of establishing the business is not synonymous with going concern value, nor is going concern measureable by the cost of establishing the business, or getting the business after the works are constructed. While it has been attempted in many cases to measure going concern by the deficiency in the terms, it is a wholly false assumption, and should be dropped. If these early losses are considered a measure of going concern, then the bigger the losses, the greater the going concern value, and if there are no preliminary losses, going concern would have no value, while, as a matter of fact, with no early losses, going concern is more apt to have a higher value than where they exist.

10,843

From what has been learned of the financial history of the Spring Valley, the early losses and inadequate return were more than made up by excessive profits up to and including the year 1880. If there were losses, there is no reason for the present rate payers making them up now, or continuing to pay interest on them for all time. The reasons for those early losses are not apparent. The records of gross income and operating expenses during those years are long ago destroyed; there is no source from which can be determined today whether or not those operating expenses were proper charges against the rate-payers, or whether construction payments were not regularly made from funds charged to operation, and never charged into capital. It involves too high a degree of speculation to take merely the book statements of net returns during these years without knowing and considering the details of operation and maintenance accounts. With the greatest care bookkeepers' accounts must be carefully scrutinized to be understood, even when all the facts are recent and known, and to go back to 1865 and claim a deficiency in revenue of \$1,375,000 on a known investment of less than \$2,000,000 seems erroneous. It is to be noted that the first issue of \$69,500 of five year 12% bonds was a payment made to stockholders for a return of stock to the treasury, presumably. It seems to have been one way of getting rid of an undesirable element in the Company. It might well be that the actual net return which the Company earned

from its business in all those early years was largely in excess of these reported earnings of which we have no details today as to derivation.

10,844 Again, considered from the standpoint of reproduction in 1913, it seems entirely illogical to add an arbitrary sum for hypothetic development expenses in view of the actual conditions at that time. There were, on December 31, 1913, more than enough concerns in San Francisco to take every drop of water which the Company could or would furnish. It is illogical to consider that San Francisco could have existed without these works, or some other works of similar capacity. It is illogical to assume the time of construction from now until 1922, with the other speculations as to population, consumption, extensions, additions and abandonments of the future. There seems to be no definite measure of development expense in this case, and it would be improper to use it as a measure of going concern if there were.

These considerations have led me to the conclusion, not that going concern value or development expenses should always be ignored, but in the case of the Spring Valley Water Co. there is no justification or plausible theory for an allowance in addition to the total reproduction value of lands, structures and rights. This estimate is made with the full consideration of all reasonable overhead and interest-during-construction charges, and it does not seem reasonable to add to this for going concern value. Historically it is highly probable that the cost of acquiring business, except possibly in the first few years (errors of which are too far off to rectify now), so far as it involves expenses of solicitors or agents, is and always had been allowed as an operating expense.

I also made an examination of the figures that we have in this case as the original cost of the properties which are in use, for the purpose of comparing that total with my figures.

10,845 Taking the data of original costs from the first three columns of Table A, Exhibit 170, which gives the total cost of lands and structures, with the dates of acquirement or expenditure, and using also Exhibit 171, which gives the property out of use and never used, with dates of abandonment or sale, and acquirement, respectively, I have computed the present value from original cost. Those were Mr. Metcalf's figures on the original cost of the property, and I have accepted them as correct in this estimate of original cost.

By a 2% annual increase in land values, and deductions for exclusions acknowledged by the Spring Valley Water Co., the present value of lands would be \$12,263,000.

The cost of the lands excluded by the City which are not admitted as proper exclusions by the Spring Valley Water Co. (amounting to \$3,231,000), brought down to date with the same 2% annual increase compounded annually, would amount to \$4,100,000. This

SPRING VALLEY WATER CO. VS. CITY AND COUNTY OF SAN FRANCISCO

reduces the present value of lands estimated on the basis of first cost, with 2% annual increase in value compounded annually to \$8,163,000.

The previous amount, \$12,263,000, fixes the original cost at the time the lands were purchased, increased 2% annually through 1913, and this other is an exclusion which the Spring Valley did not recognize, carried on in the same way, with the difference taking it at that date, 1913.

10,846

The original cost of structures was taken as given by annual expenditure increased for overhead and interest $15\frac{1}{2}\%$, and depreciated annually 1.86% of the depreciated value. This is in accordance with my estimate of an annual depreciation allowance. Property once used and abandoned is not deducted in this computation, but property never used is deducted at the time of construction. This amounts to \$14,400,000.

Some considerable deduction should properly be made from this amount for structures which have been used and abandoned, but just how much they were used, or what their condition or value at the time of abandonment, there seems no data for. The largest single items which should be considered in these deductions are Islais Creek structures; Locks Creek development; Lobos Creek structures, including a pumping plant at the mouth of Lobos Creek; the flume from the Lobos Creek plant through the Presidio; the Upper Pilarcitos; and a large portion of the Upper Crystal Springs Dam; the Niles Aqueduct, which has no present pertinence, except in connection with water rights, and Calaveras which comes in use for the first time in 1916. Probably the Calaveras should have been deducted in the original computation, but it was not, and it is deducted in this way, and will be deducted now.

10,847

This would make the present value, with the above hypotheses, which are in accord with my estimates, \$22,563,000, less whatever should be deducted for the structures abandoned as discussed above, which seems a reasonable check with my depreciated cost of structures, and the City's appraisal of lands and rights. The structures abandoned, which are not deducted, are estimated by Metcalf in Exhibit 171 at \$2,617,639. The deductions as of 1913 would leave a total original cost estimate of \$19,945,000, using the hypothesis outlined above.

The next sheet of Exhibit 212 shows the cost of lands not in use, as claimed by Dillman, in addition to admissions by Spring Valley Water Co. The year is the average time of payment for these different parcels. The Francisco Street Reservoir lands have not been deducted; that is because their value after acquirement seems doubtful. They were purchased with a large lot of other property. The weighed average time of acquirement of Merced seems to be 1884, and so on down that column. The total cost of Merced as shown in

10,848 Exhibit 135 is \$1,005,662.95, and taking the proportion in use leaves to be deducted from original cost \$714,020. This table is a little bit confusing; the original cost should have been placed first, then the factor representing the compound interest to 1913, as applied to the original cost, would reach the value in 1913 on original cost basis with 2% added; in other words, the first column there shows the result of the application of the factor of increase to the original cost.

I made a study of my estimate for comparative purposes on the figures introduced by Mr. Wadsworth and Mr. O'Shaughnessy. It is not a check on an estimate at all, and is as follows:

10,849 COMPARATIVE ESTIMATE OF COST OF DELIVERY OF WATER TO SAN FRANCISCO WITH NO DISTRIBUTION, BUT CAPITALIZED PUMPING COST ADDED TO RAISE THE WATER TO HEIGHT OF LAKE HONDA.

Authority	Exhibit	Supply	Cost per		Remarks
			M. G. D.	M. G. D.	
Hazen	194	Peninsula	20.	\$ 797,000	
Hazen	194	Alameda	18.	745,000	
Hazen	194	Sacramento	60.	700,000	
Hazen	194	Calaveras	25.	635,000	
Metcalf	199	Present	41.5	934,000	Dillman's Segregation
Metcalf		Present ex-Merced	38.	834,000	
		Present	41.5	808,000	Using City Valuation of Merced lands
Metcalf & Hazen....	199	Merced alone	3.5	2,040,000	
Wadsworth		Hetch-Hetchy	160.	484,000	Cap. pumping added
Wadsworth		Cherry-Stanis.	215.	433,000	Cap. pumping added
Wadsworth		American-Consumnes	215.	439,000	Cap. pumping added
Wadsworth		McCloud	260.	374,000	Cap. pumping added
Wadsworth		Sacramento	133.3	474,000	Cap. pumping added
O'Shaughnessy		H. H.—A	60.	836,000	Tunnel Overbuilt
O'Shaughnessy		H. H.—B	120.	528,000	Tunnel Overbuilt
O'Shaughnessy		H. H.—C	160.	488,000	Tunnel Overbuilt
O'Shaughnessy		H. H.—B 1	120.	507,000	Tunnel Overbuilt
O'Shaughnessy		H. H.—C 1	160.	444,000	Tunnel Overbuilt
Dillman		Present	41.5	481,000	Tunnel Overbuilt

In arriving at my basis of comparison, for the first four I simply copied Mr. Hazen's estimates; the next estimate, Metcalf's, the present supply, I took from his total estimate of the city structures. I took Metcalf's lands, structures, and water rights, and added Hazen's capitalized pumping costs for the three sources; that makes a value of \$49,772,000. From that I deducted city lands and structures, amounting to \$11,021,000, leaving \$38,751,000 as the cost of water delivered to San Francisco at an elevation of Lake Merced, but not distributed, of \$934,000 per million gallons. The next computation is made by leaving out Merced, and that gives 38 million gallons daily, at a valuation of \$834,000 per million gallons.

The next computation is using Merced, but with the City's valuation at Merced; that gives 41½ million gallons at \$808,000 per million gallons. Merced alone, as given by Metcalf and Hazen, would cost \$2,040,000 per million gallons; Wadsworth made several estimates of cost of various water supplies on the same basis. In those

other cases I added 2 cents a thousand gallons for pumping. Hazen uses in one case 3 cents, and in other cases less, but I used the flat 2 cents right straight through, which is probably slightly excessive. To the Wadsworth estimate of 58 million I added capitalized pumping costs of \$19,470,000, getting for 160 million gallons daily from Hetch-Hetchy \$484,000 per million gallons, and so on.

I made no deduction for the value of the power rights on these mountain sources. I have not considered the power rights, except possibly as offsetting the expense of over-building the plant temporarily, interest and depreciation. It might cover the cost of reser-voiring adjacent to the city, if that was considered essential, but adding \$5,000,000 for that purpose to each of these estimates would not change these figures 10%, and most of them about 5%. I obtained my own estimated per million gallons daily cost by taking out the city structures and lands, and working capital, \$7,089,951 from the \$22,000,000 which was my estimate.

10,851

(It was agreed among Counsel that as far as the real estate is concerned there is no issue as to the ownership and title of the prop-erties of the Company. Counsel for Defendants does not concede the Company's title to all the water rights, however.)

Witness: N. RANDALL ELLIS for Defendants.

Ellis

DIRECT EXAMINATION BY MR. SEARLS.

10,852

I have made a compilation of the figures shown by the witnesses of the Defendants in this case, so as to show the effect of the testi-mony of other witnesses than Mr. Dockweiler and Mr. Dillman upon the total valuation in the case. In selecting the units submitted by our witnesses, I selected the ones which from such knowledge of the testimony as I have in the case seemed to me the more reasonable. I am not giving my own valuation of that item when I say it appears to me most reasonable. I am simply limiting myself to the selection of the Defendants' witnesses whose units seemed more closely to approach what in my judgment would be possibly a proper unit. I was limited, in other words, on a number of units, simply to the testimony of Mr. Dillman and Mr. Dockweiler, and from such testimony as I have heard in the case, and such knowledge as I had, I selected the unit that seemed more reasonable to me; at the same time, that does not represent the unit that I might have placed upon the structure if I made an independent appraisal. It was my idea to present of the Defendants' witnesses, without reference to the testimony of the Plaintiff's witnesses, what seemed to be the best, in my judgment, of these costs.

10,853

(Tables showing structural appraisal, applying selected unit costs, overhead and depreciation of Defendants' witnesses, etc., N.

Randall Ellis, introduced and marked "Defendants' Exhibit 214".)

Mr. Ellis: This first memorandum is entitled "Memorandum on "Unit Costs used in compilation of the following tables"; Outside structures; agreed figures were used for the following class of structures: Buildings—pumping stations; roads, fences, telephone, and transmission lines, etc.; flume lumber in place; these figures appear in the joint exhibit on file in the case.

The basis of labor cost of riveted wrought-iron pipe was the reproduction estimate, Exhibit 104, D. Dorward, supplemented by his testimony. These labor costs were developed to a total cost per foot by the addition of dip at the agreed figure of 1 cent per inch of diameter per foot of length, and the metal at 4 cents a pound. The development of Dorward's figures on the sizes of pipe which he appraised are shown in Table 3. The sizes covered by Table 3 approximate 75% of the total metal in riveted wrought-iron pipe. For sizes not appraised by Dorward, prices were derived from his given prices by the ratio of increase and decrease of labor costs per pound, practically in accordance with the same ratio appearing in Hazen's tables. In other words, there were certain varying thicknesses of the same size of pipe that possibly Mr. Dorward did not put a definite figure on. If the relation between the pipe that Mr. Hazen appraised on the two sizes could be determined, which it could from a table, I simply applied the rate of increase or decrease, taking it as the fairest method.

Referring to Table 3, page 1, 30-inch by $\frac{1}{4}$ inch pipe, the first three items aggregating .026156 appear directly in Dorward's Exhibit 104; he subsequently testified to an additional allowance per pound for attaching man-holes and appurtenances of practically .00055 cents. To this total labor I added 50% profit in accordance with such testimony. To that I added metal at 4 cents, which was agreed between Hazen and Dockweiler, I believe, and the dip at their agreed figure; that is the derivation of the cost per pound. For weight per foot I took Mr. Hazen's weights throughout, because they covered a general range of pipes.

Table 4 shows the unit cost per foot used on all riveted wrought-iron pipe outside the city, and indicates the derivation of the price per pound, which is taken directly from Table 3, and in the other instances it is derived as I have indicated. This price is exclusive of man-holes, blow-offs, and appurtenant structures which were appraised separately.

In the matter of bends, man-holes, blow-offs, straps, gates, etc., these were appraised in detail by Dockweiler, and his prices were used as an addition to the cost per foot shown in Table 4. In other words, the cost per foot as derived in Table 4 was applied directly to the lineal foot of pipe, and all appurtenant structures were additional in cost, and as they are listed in the inventory. It will be

noted that while Dorward's labor cost figures include the labor cost per pound for attaching man-holes, straps, etc., to the extent that the labor cost is also used in Dockweiler's figures, this item is apparent duplication, but I have allowed it to remain as such as a possible offset to any addition which might be added to Dockweiler's base figures on these various appurtenances if Dorward were appraising them. In other words, taking the attaching of a man-hole, where I have used Dockweiler's price on man-holes, it also includes the labor cost, and that labor cost is included by Dorward. The matter is slight, and I assumed that possibly if Dorward were appraising that appurtenance, his base cost without labor might be slightly higher than Dockweiler's. It is a matter that is rather insignificant, and amounts to .0005 cents. 10,856

On trenching and backfill for riveted wrought-iron pipe I have used 70 cents per cu. yd. covering both operations.

Questioned by Master.

In Table 4, where I have opposite one set of items the word "derived", and opposite another set of items the remark "Estimated, "Ellis"; the difference is this; on the derived figure I took the base costs per pound, as shown in Table 3, and increased or decreased them by the same ratio as Mr. Hazen increased or decreased his; there were a few scattering sizes of pipe on which I simply interpolated the costs, simply approximated as closely as I could. The information was not available to make the same ratio, and I interpolated as nearly as I could.

Those were the figures interpolated as closely as I could. The computations as to the item "derived", I have not here to show the method. Taking such an element as the 36-inch gage, 203, I had Mr. Dorward's appraisal at .075896 per pound. It appeared that Mr. Hazen used practically the same price per pound for a slight variation in thickness, and if he did, I followed him there; if on another size of the pipe Mr. Hazen's fluctuation in price per pound was 10% or 15% higher, I applied the same percentage to Dorward's base and size to derive these figures. 10,857

On concrete in the Crystal Springs Dam I have used Newman's figure of \$6.50 per cu. yard. On the miscellaneous concrete structures outside the city I have followed Dillman's figure, which is in general \$8 per cu. yard. This is exclusive of concrete for tunnel lining.

On all tunnels I have used Dockweiler's figures for driving and timbering, and for brick lining, and appurtenant structures. For the concrete lining of Sunol Tunnel I have used Dillman's figure of \$10 per cu. yard, as I was using Dillman's concrete figures throughout in this vicinity.

Earth dams and flumes: On embankment work I have used the figure of 50 cents per cu. yard. On stripping I have used my figure 10,858

of 35 cents per cu. yard; for clearing, Dillman's figure of \$50 per acre; for puddling, Dillman's figure of \$1 per cu. yard.

For flume excavation I have used my figures of earth 32 cents per cu. yd., loose rock 65 cents per cu. yd., solid rock \$1.10 per cu. yard. For tarring and caulking and miscellaneous structures on flumes I have used Dockweiler's figures. In general, on outside work, where brick is involved, I have used Dockweiler's figures. The base cost of putting in flume lumber per thousand was what we agreed on the final figure for of \$47, but the tarring and caulking was not included in that figure.

10,859 On numerous small structures which are appurtenant to the main structures Mr. Dockweiler has, in all instances, followed the schedule rigidly, and appraised them all in detail; in such cases I have taken Mr. Dockweiler's figures. In many cases these items were grouped by Mr. Dillman in a lump sum, so my only recourse was to take Mr. Dockweiler there.

On submarine pipe I have used Mr. Dorward's figures for cost of pipe installed, as shown in his Exhibit 119. For all appurtenant structures on submarine lines I have used Dockweiler's figures.

Sunol filter beds: For top soil excavation I have used Dillman's figure of 25 cents per cu. yard; for all hand excavation I have used Dockweiler's figures, ranging from \$1.25 per cu. yd. up. He has a variation throughout that Sunol excavation. For the concrete I have used Dillman's figure of \$8 for plain concrete, and \$10 per cu. yd. for reinforced concrete.

For Sunol Water Temple I have taken Hazen's figures, derived from actual cost—\$17,844.

Pleasanton ranch houses: I have used Dockweiler's figures for reproduction, and for present value I have taken Callaghan's figure.

10,860 Lake Merced structures: I have used Dillman's figures, with the exception of the tunnel, the riveted wrought-iron pipe, and miscellaneous small structures which he did not appraise in detail.

On the Calaveras Dam I have used Dockweiler's figures.

On city structures the main items of the distributing system have been agreed upon.

For city reservoirs, for excavation, embankment, and concrete, I have used Dillman. On gates, small structures, miscellaneous items which have been appraised in detail by Dockweiler, I have taken his figures.

On riveted wrought-iron pipe in the city I have used some derived costs per lineal foot as for the outside pipe.

For the trenching I have used the same units as I have used in outside pipe trenching, plus the differential between city and country trenching, as used by Dillman, which also closely approximates that used by Hazen. That was that differential to add for additional cost of trenching under city conditions which was filed as an exhibit

by Mr. Dillman, and included in Mr. Hazen's tables. This compilation is shown in Table 5. On the miscellaneous tanks I have used Dockweiler's.

On the matter of overhead, since Dockweiler's overhead approximated 22% as an average, and Dillman's somewhere in the neighborhood of 16%, realizing that the overhead, to a certain extent, was dependent upon the unit costs used, that is, one appraiser might reflect a certain portion of his overhead in his unit, and vice versa, I attempted to weigh the two percentages of overhead used by these two appraisers, to the extent that I have used their figures. It approximates a derived overhead on that basis of 20%, so I used 20% throughout.

That includes interest-during-construction. In the matter of depreciated conditions, our two appraisers, while varying on numerous structures, in the aggregate were quite close; Dockweiler's depreciated condition was somewhere in the neighborhood of 75%, and Mr. Dillman's somewhere in the neighborhood of 74%; in general, on the outside structures, I used Dockweiler's depreciated condition, and in fact, throughout, except on certain city reservoirs where I hardly thought his depreciation used was consistent with the same treatment outside, in which case I used Dillman's; in other words, Dillman's show a little higher past condition than Dockweiler on certain city reservoirs. The results are shown in the first set of tables, headed "Outside Structures", followed by two pages of inside properties. The items are listed in detail in accordance with the classification in the agreed inventory.

10,861

The first column shows the reproduction cost; the second column reproduction cost plus the overhead; the third column the percentage of the depreciation; the fourth column the derived amount of depreciation; the fifth column the difference between the second column and the fourth, or present value. The items I have just mentioned cover the first two pages of outside structures, and the next two pages inside properties.

The next page, headed "Summary of valuation", is a little misleading. This is a comparison with that summary which accompanies the comparative exhibits, and which shows the reproduction cost on these various items before the application of overhead; in other words, reproduction cost, applying the base unit costs, before the application of overhead, and of any depreciation.

10,862

At the bottom page 2, as a matter of comparison, I have shown how this total that I derive of \$17,109,000 compares with the comparable figures of Messrs. Hazen, Dillman, and Dockweiler, substituting in their figures the agreed figures on all structures where we agreed for the original figures of the appraisers so as to make them directly comparable; and as Mr. Dillman in his totals had not included the Calaveras Dam, and the others had, just so as to make the

total comparable in a general way, I added in Dockweiler's figure on Calaveras, which approximates that of Hazen's.

Questioned by Master.

These figures comprising my own review, Mr. Hazen's Mr. Dillman's and Mr. Dockweiler's, are figures for structures without overhead and without depreciation. The structures with overhead are grouped in general groupings. In other words, I made this last table to which we refer to compare with the table which had been prepared by the Company, in which overhead and depreciation have been ignored; the overhead and depreciation, of course, as shown by groupings of structures, is in the first two tables.

Questioned by Mr. Greene.

10,863 I have not exactly a similar table to this one here at the bottom of page 2, showing what the result would be after the application of the overhead to the different people, and subtracting that depreciation. It would require the changing of Mr. Hazen's inventory to the extent that these figures were agreed on, and then seeing the effect of that on his overhead and on his depreciation; while he testified to the final step as to his derived depreciation condition including overhead, he does not show the intermediate steps, and neither have the other appraisers, so I did not make the intermediate computations.

Table 6 is a recapitulation of the preceding figures, showing the reproductions, including overhead, of outside and inside structures, the depreciation on those amounts, and present value. That figure is comparable with the total reproduction cost; the first column of \$20,864,000 is comparable with the total reproduction cost of Messrs. Hazen, Dillman, and Dockweiler, to the extent that they all appraise the same items; Mr. Dillman did not appraise the Calaveras Dam. Mr. Hazen was somewhere in the neighborhood of 25, and Mr. Dockweiler was somewhere, I think, in the neighborhood of 19.

10,864 Mr. Hazen's 25 would be comparable with the \$20,000,000 here, after deducting both of these items that appear in my deduction; for instance, Ravenswood Wells, Pleasanton Drainage system, Pleasanton ranch houses; he did include inventories. The deductions follow on the same line as the deductions of Mr. Dillman, except that I have used the substituted figures that would be derived from my preceding figures. That is, I deducted the same items that Mr. Dillman deducted, according to his exhibit this morning, and substituted my own figures. That gives a total present value of \$15,273,583, aggregate deductions of \$2,069,040, or net for structures, depreciated condition, of \$13,204,543. To round out the total I added Dillman's Table No. 3, covering lands, water rights, rights of way, working capital, \$9,000,000, giving a grand total of \$22,204,543.

The deduction of \$962,703 for paving is the agreed figure, and I followed exactly the same procedure as Mr. Hazen and Mr. Dillman.

ONE HUNDRED AND FORTY-NINTH HEARING.

MAY 2, 1916.

Witnesses: GEO. L. DILLMAN for Defendants.
J. M. BAILHACHE for Defendants.
S. P. EASTMAN for Plaintiff.

(Counsel for Defendants stated that as far as the city is concerned there is no dispute about the right of the company to furnish water in the way in which it has furnished it during the seven years in controversy, and about the right to collect rates for it.)

(It was agreed among Counsel that there were hearings held by the Board of Supervisors, and that consideration was given to the subject of the fixing of water rates.)

(It was agreed among Counsel that as far as rainfall and consumption statistics are concerned, as contained in complaint for the purpose of this case, they are correct. Counsel for Defendants, however, stated that if Mr. O'Shaughnessy made statements about the per capita consumption different from those, he would naturally rely on his figures.)

Witness: GEO. L. DILLMAN for Defendants.

CROSS EXAMINATION BY MR. MCCUTCHEN.

Referring to Exhibit 212, I consulted with Mr. Steinhart in regard to some of the exclusions in 1915; other parts at various times since. I don't know that I had any expectation of making such a report prior to two months ago. My impression is that I expected to do it subsequent to Mr. Hazen's summing up. I never heard of the rating base being used until I heard Mr. Hazen use it. I had considered the subject of going value, going-concern value, and development expense, with reference to this case prior to the beginning of Mr. Hazen's summing up. I discussed the matter with Mr. Steinhart, and I think he has not been connected with the case this year. I wrote out my notes on going concern, but whether I gave them to Mr. Steinhart, or talked them with him, I do not know. I had considered the subject of going concern in the abstract and concretely prior to that time. I discussed a paper written on the subject in a discussion of the American Society's papers, and I think my discussion was published between one and two years ago.

The views expressed by me at that time did not entirely correspond with those expressed in this paper, but I don't remember how they differed. I had occasion to consider the subject concretely in the Hayward valuation. In that case I considered I would not ask anything for going concern, because I thought there was no going concern value in that case. I don't remember that it has come up

10,875 in any other case concretely, and generally speaking, I do not think that the element of going concern has value with reference to a piece of property of this kind. I think it always has value; sometimes a minus value, however; in the case of a competitive business I think it has value one way or the other. In the case of a monopolistic business, where it is not regulated, it may have a very great value. In the case of an unregulated monopoly it would probably have value, but generally speaking I don't think it has. My rule is that in a regulated monopoly, such as the Spring Valley Water Co., going concern has no value, and I get that from reading and consideration of cases. I include litigated cases, but I am not prepared offhand to state just what cases they are. In my mind the general rule was that going concern had no value in cases of this kind, and when I use the word "general rule", I mean in my view. I do not claim that that is based upon any rule laid down by authority. That general rule is founded largely on my idea of fairness. I think it would be unfair to attach any value to the element of going concern as applied to a company that was so situated that it had a monopoly of the business of supplying a commodity in a particular city, but whose rates were subject to regulation. I do not think of any case now that I would attach a value to going concern. At the same time, there may be some cases that I would consider some addition for that element of the property. This general rule which I announce, and which is my own view is that going concern has no value in any case of this kind of a regulated public utility. There may be exceptions to it. I do not think just now how the exception could arise, but it is a matter that I do not want to come to a final conclusion on. I have not studied those litigated cases. I have not read all the literature that was available on the subject of going concern. This matter is still in an embryo state, and if the courts finally become sufficiently unanimous to make that the rule that going concern has a value, I probably shall accept it, or if any fact came up in connection with the plant which would warrant, in my opinion, an addition for going concern, I would add it. I do not think of any facts that would warrant such an addition now. I do not think of any such exceptions to the rule.

10,876

10,877

10,878 It would be improper to use any losses as a measure of going concern. Where I stated in my discussion of going value there seems to be no definite measure of development expense, I mean identical with early losses; in other words, development expense and early losses are to my mind synonymous, but I draw a distinction between development expense and going concern. Development expense was the expense of getting a plant going after you are ready to go, and going concern is the amount which the plant pays return on in addition to investment. When I say in this case going concern has no value, I mean going concern as I have just defined it. That element is directly connected with the profit which is realized by the company;

it is not connected with anything else. Going concern value is nothing, unless the profits, or the idea of future profits, is taken into consideration.

Going concern is different from good will; good will simply is a presumption that the good feeling toward the management of the company will extend to a successor in management, and it was usually considered only in a transfer of property, and it is called good will, and it is used and has a value that is otherwise not shown in the inventory or the appraisal of a property. Good will is the expectation of continued patronage. Going concern is the capitalized return over and above the proper return on the investment in the business, and it does have a very big value in competitive business, but it should not have any value in this business. This is a protected monopoly. The going value is a very fluctuating thing, and there is nothing fixed about it, but in this competitive value the going value may be very considerable this year, and next year negative, and the year following entirely gone; going value isn't a fixed thing in connection with a business at all. Going value with reference to a competitive business is the amount of the capitalized return over and above the investment in the property, and in connection with a protected monopoly it does not exist.

10,879

10,880

Questioned by Master.

It might exist in the case of two competitors, but it would be more likely to exist in the case of the one paying the biggest return, the one having the best business in proportion to its capital.

CROSS EXAMINATION BY MR. MCCUTCHEN.

Going concern has not any connection with the cost of developing business at all. I don't know that I could cite my authority for that statement. I do not think it is my own opinion unsupported, but at the same time, I do not know where the support comes from if it has any support.

In my experience there were two companies supplying water to Oakland at one time in very severe competition, and at that time neither the Contra Costa Water Co. nor the Oakland Water Co. could have been said to have had any value of going concern at all. I think it was a minus value in the case of both companies.

10,881

Companies in competition in supplying water to a municipality, their rates being regulated, should not have any going concern value, but the rates may have been so made that one or the other, or both, could be said at that time to have going concern value. In other words, if the rates were remunerative to either of them, assuming there were two competitors, each would have a going concern value, and if the rates were unremunerative, neither would have a going concern value. If one had a monopoly, while the rates were remunerative beyond the proper return for the amount invested, that would have

10,882 a temporary going concern value. It is the ability of the plant to produce returns in excess of a fair rate of interest beyond investment that determines whether or not the company has any going concern value, and that is what I mean in my discussion of going concern value, as set forth in my paper. If the rates are right, the Spring Valley would have no going concern value; if the rates were low, the going concern value would be negative; if the rates were high it could be said to have a going concern value, but it should not be added in this case, for it could only be added on the presumption that the returns are over the amount necessary to pay interest on the investment.

I have read some on the subject of going concern value, but I don't know now of any engineer who has ever expressed that opinion besides myself.

10,883 I have considered that each part of the plant as it was built came into use very shortly afterwards, and that therefore the early losses are paid for early in the history of each part of the plant as completed. I have not considered the substitutional plant at all. I have not considered the possibility of the plant being begun in 1913 and finished in 1922, or begun in 1903 and finished in 1913.

In discussing going concern value I think I very likely said that I was looking at the matter from the cost of reproduction standpoint, and that elements of cost of reproduction included everything, and that therefore it was not proper to consider any going concern value. So far as my reproduction cost is concerned, that was taking the plant as it exists, and as it was built, and putting prices on it as though it were recently built, but in considering the going concern value, or any early losses, or any development expense, I have not considered that any part of this plant was long held in this use, or that the plant was built entirely before there were any users to take water, or that the users waited for water. In my paper I said the estimate is based on the assumption that the reproduction cost is a measure of value—the prices put on are the prices of a going concern. If this were not a going concern, my prices would be less, and in that case, the reproduction cost would not be a measure of value at all. That is to say, if there were not a going plant, and business attached to it, reproduction cost would not be a guide.

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Concrete work would cost just as much to reproduce for a plant without business as for a plant with business, but it would not have the value, according to reproduction, at all; it would have a value for something else; the machinery would have a second-hand measure of value, and the pipes would have a scrap value if it were not a going concern. Going concern from the point of business adds return to the value which is not represented by investment. I have heard of the Kansas City case, but I have not followed carefully any of the cases in the courts. I have read some of the extracts, but I am not an authority in any of those decisions. If that concrete work were

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not owned in connection with a going concern, it would be worth a very small percentage of its reproduction cost, in many cases nothing. It is because it is used in connection with the going concern that it has the value of several million dollars which I have put upon it, and only for that reason. It is that element of going concern that gives it its reproduction value. There have been places where there was no business where there were works built, and maintained, and operated for a great many years; take the Nashville City case: they built a magnificent water system there, of cast-iron pipes, before the city was built at all, and the last I heard of it the city had not been built up to the plant; there was a complete concern that did not have value in proportion to the cost at all. I would not have found that to be worth its reproduction cost if I had been called upon to determine the question.

In a certain way, the question of going concern does have an important bearing in that case; if the property is a going concern, and is in full use, they have a value of the full reproduction cost, but if it is not a going concern, or is only a partial going concern, then the value could not be measured by the reproduction cost. It seems to me that was taken into consideration in the initial premises that the reproduction cost is a measure of value of structural plant. I do not think now of a case where it did not follow that all of the elements that go to make up a property of this kind would never be worth more than the cost of reproducing the physical elements. It would be possible that that would be the case; if I knew a plant that had returns over and above the proper interest returns on the amount invested, the value of the plant, and those were to continue as a steady thing, I think I would advise a client that the matter had going concern value in excess of reproduction cost.

I have intended here to present the figures of actual cost of reproduction, so far as the physical properties are concerned, and I consider that these properties are worth that cost of reproduction so determined by me. Cost is a matter which we can get at, but value is purely a matter of opinion, and no matter how the value is dissected, each element of value is purely a matter of opinion. In the case of a trade, the value is apparently fixed at an amount, but it is still merely the consensus of opinion between the two traders; if a property of this kind had any reasonable assurance of an excess of return over the cost of operation, maintenance, depreciation, and interest on the cost, then it would have the added value which I have considered and called going concern, but which I have eliminated in this case, because it should have no part in this kind of a valuation, and if the regulation of the monopoly is right, and not excessive, there is no going concern value; if it is below what is proper, then the going concern value would be negative. In other words, the property would have a value in my mind less than the reproduction cost, and it seems to me that is so with

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any property; in valuing property that is not so regulated, and which can be so managed as to produce a greater return than would be interest on the investment, going concern value would apply, and therefore more frequently it applies to a competitive business, merchandise business, manufacturing business, than it does or should to a regulated monopoly of this kind.

10,888 My acquaintance with the term "going value" is comparatively recent. I do not think it has been called going value in my experience. The discussion of the subject of going value has centered, very largely, around the valuation of public utilities, and of regulated public utilities, as a rule. I cannot say what the consensus of opinion of the engineering profession is on that subject. I am here to give my opinion that the going value is nothing in this case. It is my opinion these physical properties are worth the cost of reproduction as I have determined that cost, and that conclusion is based, to some extent, upon the assumption that the company was to receive a fair rate of return. I don't know that I am specially competent to say what a proper rate of return is; to the extent that I have any money I want to get just as much return from it as I can, and so to me a fair rate of return would be a little bit higher than to a man who was satisfied with 4% return on this investment, but as to what is a fair rate of return, I hesitate to answer, simply because I think others are more competent to answer, and I am not an expert.

10,889 I should consider that 7.7% in the case of the Spring Valley Water Co. would be a liberally high rate of return. I would rather not discuss what the rate of return should be to be fair. I do not want to pose as a financial expert, but 5% would be the lower limit of fair return, and 7% the upper limit of fair return. In this last year which appears in my Table 7, I have a return of .7 of 1% above the upper limit of fairness; the company had going concern value for that year, but I have not allowed it. The going concern value attached to that year is the difference between \$24,200,000 and \$21,964,000, capitalized. The fiscal year 1911-12 it had a going concern value which was the difference between \$21,510,000 and \$23,400,000; the fiscal year 1912-13 it had a going concern value of the difference between \$21,970,000 and \$23,600,000; in the year 1913-14 it had a going value of \$1,600,000. 10,891 I didn't add those, because that going concern was due to rates which were beyond sufficient to bring 7% on the value of the property on a reproduction basis.

For the purpose of going ahead with this examination without any delay I have considered that the rate should be between 5% and 7% on the value, which is a very wide margin. I have come here to tell you that going concern is worth nothing in this value in connection with this kind of property, and I am quite content—with those premises—with my opinion, that going concern value for those four years was what I have said it to be. I guess that is the most reliable basis

from which to consider it that I can suggest, and I think it is reliable. There should be no such thing as going value in the case of a regulated monopoly; with exceptional receipts there is a very decided going value in many cases. This is a regulated monopoly in this case, and I am quite content with my opinion that this regulated monopoly had a value for going concern for those four years that I have stated, but it is not a permanent value, because it is a negative value on the same hypothesis in the earlier years of this period. This element of going concern had a certain value for the year 1913, we will say, and if the Board of Supervisors had seen fit to adopt a grossly inadequate rate schedule for the following fiscal year, that going value would have been wiped off the books; it apparently was wiped off the books for the first four years of the period 1907 to 1913. I think the company was rather more able to serve the needs of the public in those four years; the shortage in those years was due to a lack of population, but the business of the company was just as well established for those years in the sense that it was a going concern as it was for the last four years of that period.

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I say that for the first four years the element of going concern had no value, whereas, for each of the subsequent four years it had value on the 7% basis. If, however, it is found that a 6% return is a proper return, then there would have been a full return in 1908, and an over return in all subsequent years, and still a deficiency in 1907 and 1908. On the other hand, the value of going concern would have multiplied several times. If the proper return is only 6%, the going concern in 1913 would be \$5,600,000 from the rates of the ordinance, and if money was only worth 5%, the proper return, the going concern would be \$11,100,000, so that the computation would be that if his Honor should find 5% to be a fair rate of return for the last year, he should find that going concern value was in the neighborhood of \$11,000,000. Under the premises stated, at 5%, it is my opinion in that event going concern would have a value of \$11,000,000, but I have no opinion independent of the premises.

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This is an estimate to ascertain proper value on which to make returns, and the matter of going value should not be allowed on that kind of an estimate, but computing from results obtained from ordinances, and estimates of reproduction cost, which consider value, going concern, as I have said, with 5% money in 1913, is over \$11,000,000, but that is because the rates are high enough, and the interest returns low enough to make that difference; it is a matter of computation; it is not a matter of opinion at all, independent of the premises.

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I should think 5% was a pretty low rate for that year, I was not asked to prepare myself on the question of a fair rate of return, and I do not think my opinion is of much value on financial matters.

This report was prepared in the last ten days. I prepared the original table entirely independent of consultation with anyone, and

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then discussed it with Mr. Searls, and some changes were made in initial data which was gotten only last week. I do not think I discussed it with anybody outside of Mr. Searls, except some of the men connected with parts of the valuation, and I did not discuss the general report with them. I simply took it up with them to get definite figures; the valuation of water rights, which I did not hear, I took up with Mr. Lee, and got from him; otherwise it is an independent calculation of my own. I did not approve, or disapprove Mr. Lee's valuation of water rights, and I have adopted it in this estimate. I accepted it as the judgment of other witnesses, as I accepted the real estate values without approval.

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I think the property included in the figure of \$22,000,000 is worth less than \$22,000,000, but I don't know how much less. I have taken an outside figure. The actual reproduction cost of the property plays a part in the determination of that figure, but the value is purely a matter of opinion, and not a matter of fact. I accepted Mr. Lee's valuations as the value of water rights. By water rights I mean the right to take water from some place where it exists and divert it to some other place where it is wanted. I have merely accepted these figures of other witnesses without approving them or disapproving them.

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I know where the Lake Merced properties are, and have been on them not frequently, but occasionally. I have seen manure on the Lake Merced property in the truck gardens to the west of Ingleside Links, over toward the lakes. I don't know that I could tell you just where. There was a garden tract on the property, and off to the southeast portion of the tract where there were cabbages planted, it was manured several years ago, prior to 1914. It was only a few acres, a very small strip. It was not the fact that that small piece had been manured that induced me to say that that portion of the property was not in use. The principal reason for saying it is not in use was the manure, but is the fact that it was not in use. The deposit of manure upon it had nothing to do with its being not in use. Prior to the construction of these protecting works, possibly some of these gulches might have been considered in use. The part of it in use now is the lake and the strip that is included in the condemnation suit, and while I do not know just what the width of that strip is, I assume that it is sufficient for the care of the existing and the future drainage works.

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That strip was out by condemnation, and from an examination of the map I concluded, and therefore it is now my opinion, that that is sufficient. The objection to the use of these lands for agricultural purposes would not be equally potent after these drainage works were constructed; they keep the surface drainage out of the lake, and it is the surface drainage that carries pollution. I have never seen any surface drainage into the lake since these works were constructed, but

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I presume there was before their construction. I think the water that falls upon that agricultural land eventually finds its way into the lake. These protected works would not prevent that water from finding its way into the lake, but it would prevent the water getting in from the surface, and it would prevent some water getting into the lake by carrying it off to the ocean. Presumably some of that water which falls upon that agricultural area did flow into the lake on and over the surface of the ground during storms prior to the construction of these protective works, but it does not now.

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These protective works have existed ever since I have known the property, but the use of the land for agricultural purposes, and the depositing of manure upon it, I think has resulted in polluting the water; the water sinks in the sand and flows underneath in underground channels, and it would continue to do that after the future works have been constructed. The prevention of pollution is largely the sand through which the water is forced to flow now by the protective works. But for these protective works the water would also come in from the surface from the manured area during storms. I mean, when the sand is filled up, and there is a surface run-off, it would flow into the lake.

The manured area reaches—speaking of 1914—probably within half a mile of the lake, although I don't know that it does. As regards the pollution, it is a matter of hearsay, but it seems perfectly reasonable that is so, because of my knowledge of the porous nature of that soil.

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I have stated that the lands owned by the Spring Valley Water Co. constituted a comparatively small portion of the watershed drainage of the lake, which is shown by the map, "Exhibit 206". I find that it is larger than I thought it was when I made that statement; at the same time, it does not include half of the land from which the water drains into the lake, and that portion outside of Lake Merced is a much more thickly populated part of the drainage area than that inside.

If the portion of that drainage area owned by the Spring Valley Water Co. had been thickly populated, it would not be just as safe as it is in Spring Valley ownership. I know of the conditions on Lobos Creek where the Government gets its water supply, and I think it was polluted at one time, but it is being used now by the United States Government, and I assume that it is not polluted. I suppose the pollution arose from a careless use of the drainage area by people. That district was all within San Francisco, but was not well sewered for a long while, and I presume it is now, or the Government would not be able to use that water.

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I don't know how much of a law it is that prevents people from depositing anything upon their land which might directly or indirectly result in polluting a domestic water supply. The law which prevents the discharge of sewage into running streams was called to my atten-

10,907 tion by the State Board of Health in the disposition of the Oakdale sewage when I built the sewer plant.

10,908 I think it was last year that I went to the Francisco Reservoir, but I would not be very positive now that no part of the northerly half of that property is in use. I think I have so stated, but I don't remember about that now, and I don't remember on whose authority I made that statement; it came up in the discussion of these exclusions, and, by the way, the Francisco Street Reservoir is not excluded in my figures at all, because I had no value to put on it. I am informed that none of the embankment occupies the northerly half of the Francisco Street Reservoir, but from my own observation I don't know that as a fact. Assuming that part of the embankment does occupy part of the northerly half, it would make a difference in the conclusions which I have announced here, but it would make no difference in my estimate, because I have not excluded it in my computation. I made two estimates; in the original cost estimate I have not excluded it. The real estate is excluded in my original cost of reproduction, but not in my other estimate, and for the purpose of arriving at my \$22,000,000, I used the reproduction estimate. It is excluded in definite and detail figures, but it can be considered as left in by reason of this addition which I have made of \$1,000,000 to cover all of those little things. My estimate is \$1,474,000 too high, apparently. I wanted to add an outside figure which would be sufficient in my mind to allow for all errors of computation, and in making such a mass of figures there are undoubtedly a few, for all additions to my estimate which the Master might make by taking other valuations, and in the case of structures a large addition was made, because my view point was that of very high efficiency in construction, and Mr. Hazen stated that his view point was that of average conditions of management, and I thought the Master might take that into consideration, and those allowances were made to be fair and full for a rating base to consider in these rates.

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I was a witness before the Railroad Commission of this State on the application of the Haywards and San Lorenzo Water Co., for either the establishment of rates, or permission to make a transfer or a mortgage. I didn't report that the going concern value of the water company in that case was \$20,000. I did not make any figure on going concern value to the Railroad Commission, but I did make it to the attorney for the company. I told him it was not worth anything, and I did not put any figure upon it.

10,910 Mr. Oscar Sutro was the attorney for the company, and I was the engineer for the company, and when we came before the Railroad Commission, he said, how about going concern, we ought to have something for that. I said, nothing doing. If you want anybody to prove going concern, you will have to get somebody else, because there is nothing to it; and he said, I would like to convince you to the contrary, but

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he has never done it, and he will testify to those facts; while I know that the opinion of the Commission states that Mr. Dillman asked for \$20,000 going concern, it is a mistake, because it is not in accordance with my testimony, or my estimate, at all.

I made a report to the Livermore Water Co. on the subject of water rights, or water right valuations. I found the water rights value to be \$75,000 for Positas, and \$25,000 for the Mocho. I don't remember that I said, in this Haywards case before the Railroad Commission, that I had found these water rights to be worth \$100,000 per million gallons. 10,911

I was a witness, acting for the Haywards Water Co., on the hearing of the application of the Haywards Water Co. to buy, and of the San Lorenzo Water Co. to sell, the water system of the San Lorenzo Water Co., and of the Haywards Water Co. to issue 1,487 shares of its capital stock, which was held on the 18th of September, 1914, and on December 16 and 18 of the same year. 10,912

Mr. McCutchen: I will read this answer to you, and ask you if you remember having made it in the above hearing before the Railroad Commission: "Now, take a plant most nearly comparable to this "plant that I know about, take the plant at Livermore. I don't think "that—well, before the Commission, at the sale of that plant, I put a "value of \$100,000 on their water rights. Theirs is a more isolated "plant. The supply is limited, and the waterworks there controls that "available supply. That is the water rights on the Mocho, and the "water rights of Positas Springs, a pumping plant similar to this in a "certain way, and their capacity was probably in the neighborhood of 10,916
"1 million gallons per day. They pumped during one month for the "City of Livermore an average of 900,000 gallons a day, and that "value of \$100,000 was not seriously questioned. That was a valuation for transfer of the property from the owners to the Pacific Gas & Electric Co. That was not considered excessive there."

Mr. Dillman: I think that is probably my testimony. In arriving at 7½% as the annual depreciation, I got the annual depreciation, and figured the percentage on the depreciated value. I did not get it in the way I have suggested in this paper; that is to say that it bore some relation to gross return; the annual depreciation was estimated at a certain amount, and this made a certain percentage on net reproduction, on gross revenue, that is stated in my exhibit of depreciation.

Questioned by Master.

I adopted the straight-line basis of estimating depreciation. That straight-line basis of estimating depreciation makes a larger annual depreciation allowance than the curve method, the sinking-fund method, and therefore an annual allowance which covers depreciation figured on the sinking-fund basis would be a smaller percentage, a smaller amount.

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CROSS EXAMINATION BY MR. MCCUTCHEN.

I say this: The annual depreciation allowance which covers the annual depreciation, which it is supposed to offset, would be smaller by the sinking-fund method, and therefore a smaller percentage on anything that it was figured on.

In my Exhibit 101, for the year 1913 I show the total depreciation was \$273,000, made up of two items of \$140,130, and \$132,945; the first covering the structures outside the city, and the second inside the city. If I divided the \$273,000 by my estimate of gross revenue, which is \$3,040,000, the result will be 9%. I think the difference between that and my allowance of $7\frac{1}{2}\%$ is properly explained by the excluded property. There is taken out \$1,000,000 of paving over mains. There is quite a difference in there; one is an estimate of value.

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I don't know anything specific about the necessity for extensions, except that newspaper talk was in that way. I have not based any estimate on that statement, and that conclusion did not play any part in the results which I have announced here. I simply used it as accounting for the low consumption in one place, and it sounds very plausible to me. I don't know what the consumption is across the bay, and I don't know how it compares with the consumption here. The normal consumption here should be about 100 gallons per capita, and I base that principally on what I have read, and worked out in my own mind as the proper base rate for computing consumption on new plants; that probably is not exact. I have not studied the history of this company with a purpose of ascertaining when the supply was adequate to the demand, and I don't know that I would be able to get any data to cover a great many years that I know nothing about anyway, but in recent years that I do know something about, there has been a constant clamor for water out in the Richmond District, and some other similar districts, that seem to me warranted some extensions, but I have not used this insufficiency of plant, or dearth of water, to base any figures on at all.

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I don't know whether the consumption has ever been 100 gallons per capita in San Francisco in the history of the Company. I have never read the complaint in the condemnation proceedings. My information regarding the property that was excluded by the condemnation suit came from the City Attorney's office. The figure of \$1,310,715 is not my valuation; it is Paschel's, I think, and the details of the inclusions I do not know. If the lands have special value for reservoir purposes, it should include something for reservoir value. I should say I did not assume they had special value for the purposes of my summing up, in view of the probability of that supply being soon taken from the San Francisco water supply, and the lakes being kept as emergency reservoirs only. I think that repres-

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sion out there for reservoir purposes would have no value if the run-off from the watershed were not useable.

I don't know whether my summing up includes any value for Merced water rights or not. I have not gone into the details of Lee's appraisal. In my statement, page 4, second paragraph, where I mention the lands outside of the area, I mean the lands outside of the 811 acres. I think some land outside would be necessary, if it were not for the protection works there, which prevent the water coming down those draws, and reaching the lake. I don't know how much land would be necessary in that event. Referring to my statement, "If the water coming into Lake Merced is not sufficiently purified "by natural filtration through the sand of that basin, the possession "of the land outside of the area considered by me necessary for the "protection of the drainage works, is of no use to this water;" the ownership of the lands has nothing to do with the filtration. I was speaking there of the water as it goes into the lake; it falls on that sand, and only flows during a stream at flood times in the draws; to an extent I guess there is a small flow in some of them most of the time. The water that does not flow seeps into the sand, and has an underground flow which makes the lake's supply. Sometimes the water which reaches the lake through an underground supply is good water, and sometimes it is not. In this case I assumed it to be filtered water, fit for use.

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Questioned by Master.

There is a dam in each of those draws, and the water that flows on the surface is led away, but the water that gets in from these draws, as well as from the adjacent lands, through the sand underneath these protected works, comes into the lake as a filtered water. As to any surface water that would naturally come down the stream beds around Lake Merced, there is at the present time protection, and the water is led away from the lakes.

Mr. Metcalf: That is my understanding, and I think that was so during the period in controversy.

Mr. Eastman: I think that is correct.

CROSS EXAMINATION BY MR. MCCUTCHEN.

Mr. Dillman: My statement that the deposit of manure upon that land has resulted in polluting the water is simply a statement; I think I got that from the City Engineer. The statement I got was that the analysis of water shows a higher chlorine contents than it did before the farming was commenced on a larger scale. I do not know the dates on which those analyses were made, and I do not know definitely when the samples were taken. My statement that this water was polluted was simply hearsay on my part. I have not discovered personally any pollution. I have got that statement that

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the analyses shows more pollution after the lands have been used for agricultural purposes than before.

10,924 I know, in a general way, what lands the Company has acquired in Alameda County. I know it acquired lands along Alameda Creek, from Sunol up to and above Calaveras. I don't know that I am entirely familiar with the needs of San Francisco for water supply, and its dependence upon the Spring Valley Water Co.'s supply. I think I am generally familiar. It was probably good judgment on the part of the Company to acquire the lands along the creek for some distance above Sunol, and they would be considered necessary by me, but it was not good judgment, and it was unnecessary to acquire a large area of hill land away from the creek for the San Francisco water supply. Their acquisition might have been the result of very good judgment, but it is not appurtenant to the present water supply of San Francisco, because it neither adds to the production, nor decreases pollution.

10,925 When I speak of watershed lands on Arroyo Valle, San Antonio, Alameda, and Calaveras Creeks, I do not include the lands that are susceptible of use as reservoir sites, but, considering that this is a matter of opinion, I have added to my estimate some \$400,000, part of which could be directed to the acquisition of those reservoir sites. I wished to add enough in this rating base to cover the acquisition of those reservoir sites, but I did not have them in mind, particularly, when I put down my figure of \$474,000. I don't know that those reservoir sites would be considered necessary at all. In my estimate I have considered that the acquisition of these reservoir sites was entirely unnecessary, but that is a matter of opinion, and in making this allowance, I had in mind two things; the lands along the creek for the protection from pollution, and the purchase of reservoir sites, should they be considered necessary by the Master.

10,926 In my opinion it was not bad judgment on the part of the Water Company to acquire the Calaveras Reservoir site for water purposes. I think it was good judgment, but the same is not true of San Antonio. I have not made any allowance for Calaveras Reservoir lands in my summing up, but I think that the Company ought to have bought those lands looking for the future. I did not make any allowance for Calaveras Reservoir values.

I have allowed no specific sum for land values along the creeks. It would undoubtedly have cost more per acre to acquire a strip through the land than acquire the whole acreage. I am not barring Calaveras from valuation in this case, but I have not allowed for it in this rating base, because it does not belong in this rating base; this rating base is a rating base for years prior to the construction of Calaveras storage. When Calaveras storage is made, that will all come into the rating base, and it should come in with the values of lands appreciated up to the time it comes into use, and the struc-

tures will come into use in the same way, with interest on construction and overhead up to the time of use; in this exclusion the rating base is not an exclusion from the value of the Spring Valley Water Co. This rating base is not the total value of the Spring Valley Water Co. They own a lot of property that has not been put into this rating base. Some of it was acquired for water production purposes; the Calaveras being very pertinent for one part.

At the time the Company purchased the Pleasanton Ranch lands, I know only from hearsay they were threatened with a law suit for lowering the water plane, and they probably did the best thing that was to be done, bought the lands and stopped the law suits. That was the cheapest way to get that water right, in my opinion. I approve that purchase. It was good business, and then the lands could be immediately alienated for farming purposes, and in that way the water right would probably cost much less than to get it direct. I think the purchase of these lands, with the intention of alienating the land as not being pertinent in any other sense, is good business. 10,927

Referring to the financial data in my summing up; not all of it was taken from Mr. Bailhache, I took a lot of it from Mr. Metcalf and Mr. Hazen. The gross revenue is from Mr. Bailhache, and also the operating expenses and taxes. Operating revenue is the difference between columns 2 and 3; depreciation of structures is figured from my estimate, and the net revenue is the difference between 5 and 6, so that is where the net revenue comes from. The fifth column is Mr. Bailhache's, also. 10,928 10,929

The figure 2% was an assumption as to the average annual increase in land values, and I used it because in the first place it was an easy figure to compute, and I considered that with land which made a return to its owner, and also increased in value 2% per annum, compounded, it would be a very handsome increase, and I note too that the 2% increase in lands is used by Mr. Metcalf in some of his computations, and the agreement made me stay with it. I took it arbitrarily in the first instance.

My figure of 2 cents per million gallons for pumping is for water raised to the height of Lake Honda. I think 2 cents is probably a little bit high for pumping costs, but it is nearer right in any of my experience than any other even cents; it is a cent lower than the maximum assumed by Mr. Hazen, and higher than some of his other assumptions. It is a mere assumption, but it is based on my experience in pumping. I have not any definite figures to show just where water has cost me 2 cents a thousand gallons to pump. I don't know how it compares with the Spring Valley costs; it is probably excessive, though, because their pumping costs should be quite a little less than that, probably 1½ cents, or something of that kind. 10,930

In my comparative estimates of costs of delivering water to San Francisco, I did not allow anything for reservoir capacity for storing

water near the city; in both Hazen's and Metcalf's estimates, it is already allowed for, I think; in the case of the Sacramento water supply it is not as necessary as it is with the present supply, or with the mountain supply, because the conduits are not as long, and the source of supply is available at all times, and you do not have to store three years' water; if you store enough water to tide over accidents and breaks, that is as much as you would need to store. In the case of the mountain supplies I have not allowed anything specifically, but I understand in the case of the Hetch-Hetchy, and probably in the case of the Stanislaus, and the American-Consumnes projects, the power proposed to be developed in connection with those is enough to take care of storage somewhere near the city. I took Mr. Wadsworth's figures on Hetch-Hetchy, Cherry, Stanislaus, American-Consumnes, McCloud and Sacramento, and I also took some of O'Shaughnessy's on the Hetch-Hetchy.

I did not hear Mr. Wadsworth say in his examination, as I was not here, that all of his estimates contemplated the acquisition of the Spring Valley property in connection with these mountain supplies, and the use of their storage reservoirs. I think it would be very desirable to have the Spring Valley storage in connection with the mountain supply, and it would add to the cost per million gallons. Now, Wadsworth on the Hetch-Hetchy, estimated cost \$58,000,000 for 160 million gallons daily, and to that I have added a large percentage for pumping costs, a large amount for capitalized pumping costs of \$19,470,000, which makes a total of \$77,480,000; if the power receipts are not enough to make the storage, and the over-building and depreciation incidental to these large developments, and you would add \$5,000,000 to that, it would not add a very large percentage to those figures. There is no nice, fine cut about these figures, as far as that goes. In fact, allowing 2 cents a thousand gallons for pumping is a very rough estimate. If you add \$5,000,000 to the \$77,480,000, that would be \$82,480,000, and that would increase the price per million gallons to about \$517,000 instead of \$484,000. The interest-during-construction, and depreciation, I have assumed would be taken care of by the power end of the plant. I only know what the power end of the plant would produce by hearsay; there is plenty of market for power right in town here when it is once developed. Now, these other figures would be increased in like amount, but not in like percentage; the Eleanor-Cherry plant would be increased \$5,000,000; I have added capitalized operations there of \$25,500,000. On the McCloud project I have added the capitalized cost of the pumping operations \$31,000,000, so that in the McCloud case it would add only about 5%.

Mr. Searls: As far as the McCloud costs per million gallons are concerned, we can see that it is not comparable at all.

Mr. Dillman: The cost of water to San Francisco, if it brought

in the Hetch-Hetchy water at the first cost, as shown by Mr. Wadsworth, would only be \$484,000 per million gallons, based on the two premises which I stated, Wadsworth's estimate, and my capitalized estimate of pumping. I have assumed that the excess from this 160 million gallons, which is away above the present consumption, and would be for many years, would be taken care of entirely by the power end of the plant, and if it were not, it would be a losing investment. The power plant would offset the overbuilt plant, interest-during-construction, depreciation, and possibly storage. That is just a general statement, and does not pretend to be accurate.

RE-DIRECT EXAMINATION BY MR. SEARLS.

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If, since the investment in the properties was originally made, the real estate constituting a large portion of the assets of the company should appreciate in value considerably, I did not intend to convey the idea that this appreciation in realty value was synonymous with going concern. It has nothing to do with going concern. The realty in any plant, to come out even, should be put in at its value at the time of the appraisal. The investment means to include the appreciation of the lands or other properties that appreciate, and also to include the depreciation of structures and other properties that depreciate; sometimes lands depreciate. By "investment", as I used it, I did not mean the strict interpretation of the term as to the amount of money that was originally put into the plant. I guess that word should have been "value".

If we had a plant that was worth \$100, and 5% were assumed by the court to be a fair rate of return, and the plant were earning \$6 per year, we would then have \$1 per year in excess of our fair rate of return, and if you capitalized that at the fair rate of return, you would have \$20, so that would make our plant \$120, upon which the \$6 actually earned would be 5%. If you were always going to earn your fair rate of return, the going concern for that plant would be worth \$20, and the going concern would not appreciate until the earnings increased. If it dropped to \$5, your going concern of \$20 would disappear, and you would have your \$100 that you had in the first instance.

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Witness: J. M. BAILHACHE recalled for Defendants.

Bailhache

DIRECT EXAMINATION BY MR. SEARLS.

The first of these tables is a summary of the rates of interest on small loans made by the Company, as shown in Exhibit 185, which was a compilation of the loans made by the Company, showing rates of interest.

(This table, as referred to, went in as a part of "Exhibit 185".)

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The next is a statement showing further details of the Com-

pany's charges against depreciation reserve account since the year 1909, taken from the Company's books.

(Detail of depreciation and obsolescence account, Spring Valley Water Co., being further detail of items filed in Exhibit 177, showing character of the charges made on account of depreciation and obsolescence, introduced and marked "Defendants' Exhibit 215".)

10,937 Mr. Bailhache: The next is a table showing the details of the net improvements in real estate and construction from January 1, 1904, to June 30, 1915, which is merely a continuation of Mr. Wenzelberger's exhibit, and the figures were taken from the Spring Valley books and are correct.

(Spring Valley Water Co. net permanent improvements, real estate and new construction, January 1, 1904, to June 30, 1915, introduced and marked "Defendants' Exhibit 216.")

Eastman

Witness: S. P. EASTMAN for Plaintiff.

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DIRECT EXAMINATION BY MR. GREENE.

Questioned by Master.

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My connection with the Company began in 1908. At that time none of the Merced properties were cultivated. On consulting with some engineers we were advised that there could not be any objection to reasonable cultivation of those lands, after which some leases were made in the extreme southerly and extreme northerly ends of the property. That was in the latter part of 1909, and the first part of 1910. The tenants were not permitted at that time to live on the land. About that time an investigation was made by Dr. Rupert Blue, in charge of the public health conditions in San Francisco, with reference to the adequacy of the protection to the watersheds in general, and he addressed himself specially to the question of cultivation of lands and fertilization of soils on the Merced property. Dr. Blue engaged the services of a Dr. McCoy, who had had extensive experience in bacteriological work in connection with water supplies in the East, and had worked for the Army in the Philippines in connection with water supplies. Dr. McCoy made extensive bacteriological examinations, and spent several months in making a detailed survey of the watersheds, including all the problems that he thought were pertinent to his investigation of Lake Merced. Dr. Blue submitted a report embodying the conclusions of Dr. McCoy and himself. The conclusion of the report was that owing to the character of the watershed at Merced, and its capacity for filtration, there was no objection to the cultivation and fertilization then going on, nor any objections to continuing it. It was suggested by Dr. Blue that the cultivation should not continue too far down any of the ravines that went directly toward the south lake. He recommended that any tenant permitted to live on the land be required to have concrete

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basins for the catchment of any sewage, and these concrete basins were installed at that time, and all persons living within that watershed on the property, including the employees and tenants, have these concrete basins for the care of sewage.

His report was directed both to the bacteriological conditions as well as the conditions of the watershed, but Dr. McCoy and Dr. Blue both made a careful survey of the watershed, as well as bacteriological examinations of the water.

DIRECT EXAMINATION BY MR. GREENE.

In 1910, I think, the Company had a tract of approximately 1,000 acres south of Laguna Creek, and it was drawing at that time about 5 million gallons of water per day. A suit was pending, by Mr. Lilienthal, and the Pleasanton Hop Co., who owned lands just north of the holdings of the Water Company. Investigations were made by engineers for the Company, and I think it was the day before the case was to go to trial that a compromise was effected, and the lands of Lilienthal and the Alameda Sugar So., and the Hop Company, were acquired; we thought it was necessary to acquire these lands in order to increase the draft of water from Pleasanton at that time, which was then very desirable.

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More water was needed in the city, and that was the most available place to get the water in time; that is, we had structures from Pleasanton to San Francisco that would carry more water, especially during the summer time when the greatest quantities are needed. Immediately after the acquisition of these lands the amount of water taken from Pleasanton was increased, and has been increased annually since that date. After the acquisition of these three large parcels it was decided to acquire other lands that were over the subterranean body of water. In 1912 the acquisition of these lands was started, and carried on continuously, until the holdings were substantially the same as they are today. The purpose of acquiring the second aggregation of holdings was in order to increase the daily draft of water for the city, as well as to provide for future development in excess of what we are now taking.

The policy of the Company in leasing the lands at Pleasanton is to get the largest return that it can from the lands from agricultural uses under leases that are consistent with the use of lands for water production purposes; in that connection provisions are incorporated in the leases that militate against the highest rentals being secured. All of the leases covering the lands south of the Laguna Creek, which embraces the 1,000 acres, which was the original holding of the Company, contained clauses by which the lease can be cancelled under 60 days' notice to the tenant; that particular provision is not incorporated in the leases above Laguna Creek. In all of the leases in the Pleasanton neighborhood they are made subject

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to the existing condemnation suits. Tenants are not permitted to live on lands south of Laguna Creek, but are permitted to live on the lands north of Laguna Creek, providing there are buildings that can be used by them, and that are owned by the Company. Pasturage is not permitted on the lands south of Laguna Creek, and only on those north of Laguna Creek under special conditions. I think there are not more than 6 leases north of the Laguna Creek that permit of pasturage. By north of Laguna Creek, I mean Arroyo Valle Creek. Laguna Creek really starts in at the junction of the Arroyo Valle and the Laguna Creek; from that point easterly it is called Arroyo Valle Creek.

10,944

This line of demarcation between red and yellow on Exhibit 206 is what I call the Arroyo Valle Creek, and which I have referred to as Laguna Creek. The leases also provide that the Water Co. can go upon the lands at any time and put in any structures for the development of water that it sees fit. All of the leases, except one, have comparatively short terms. The Heath lease is for 10 years, but the only leases we are making at this time are for a limited period of three years. Under these provisions we do not get the maximum rentals that we might without them. With those exceptions every effort was made to get the largest return that could be had. Prior to 1908 the lands south of Arroyo Valle Creek were used for hay and barley, which produced from \$3 to \$4 per acre; in order to get higher returns the tenants were informed that they would be required to raise alfalfa, and under conditions by which they were to pay a smaller rent the first two years, and thereafter an increase of about 33%; all of the tenants at that time declined to meet this condition.

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New tenants were advertised for, and this took about two years, by which time we had practically all of that land in alfalfa, at rentals that ranged from \$10 to \$15 per acre, which was from 3 to 5 times as much per acre as they had brought theretofore. The lease to Heath—O-268—was made for a period of ten years in order to encourage the tenant to make improvements, and to grow alfalfa on the land; he leased 298 acres and put 200 acres in alfalfa. The remaining 98 acres he is improving at the present time, and eventually will have alfalfa on that. He pays a rental of \$12 per acre for the first 3 years, commencing with 1914, and thereafter to the end of his lease at \$20 per acre. The highest rentals secured on any of the Pleasanton lands are about \$40 to \$60 per acre; these are for small parcels of 3 to 5 acres, and the large rental is due primarily to the fact that buildings are on the leased property that are the homes of the tenants. We have a number of leases that pay as high as \$20 per acre. The tenants are encouraged to put in either alfalfa or sugar beets, which are the best paying crops in that locality, and they are also given concessions in leases where they will effect

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any permanent improvements in the way of drainage or irrigation, or the installation of wells, or any other improvements that go to make for future permanent crop conditions. Ultimately the highest rentals will be secured when a comprehensive system of drainage can be installed. It seems necessary in order to accomplish this to get the co-operation of other farmers living to the east of our holdings. These people are not altogether inclined to meet the conditions necessary to bring that about, but we are, at the present time negotiating with them in connection with matters that have this in view; when a comprehensive drainage system on a proper scale can be installed, lands to the north ought to produce more per acre than they are at the present time; probably the highest rental that can ever be produced on the lands in the central part of the valley would be \$25 per acre, as compared with \$20 that we are getting for a good deal of it at the present time, but in order to get \$25 we found that it was necessary to give leases without the onerous conditions that ours necessarily contain, and to also provide some accommodations, so that the tenant could live on the land, either to build for him, or to give such a long term of lease that would warrant him in building himself.

These figures will give a relative idea of the increase in the rentals of that land. I have taken an acreage of 4,641 acres that embraces most of the lands north of the Arroyo Valle Creek; the rentals for 1912 were \$26,507; the following year, 1913, was the second dry year, and, due to the lack of water near the surface, the crop conditions were very poor, and the rental was slightly under the previous year; in that year it was \$24,257; the following year, 1914, was a normal year and the rentals rose to \$36,126; in 1915 they increased to \$40,169; this year they will probably be something in excess of \$40,000.

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They embraced practically all of the lands north of the Arroyo Valle Creek, with the exception of about 300 acres at the north-easterly corner of the property towards Santa Rita.

Questioned by Master.

The Merriwa Stock Farm included in my 4,000 acres. It includes the Chabot Ranch, the Lilienthal property, the Alameda Sugar Co.'s property, the Callen properties, the De Freitas properties, Schween, Oxen, Hewlett, and a number of small parcels. The Hadsell purchase used to be farmed exclusively by tenants to hay and grain, under provisions by which the tenants could not live on the land unless buildings existed there, and there are not sufficient buildings to accommodate the tenants. They also were not permitted to pasture the lands, and the final result of that is that the lands became very foul due to excessive weed growth, and the hay crops got to be very poor; efforts were made to get in a better type of crops that would return a higher rental; one of the results of that was the

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planting of the walnut orchard at Sunol, and that ought to substantially increase the return from an agricultural point of view; other leases are made in the Sunol Valley on the Hadsell property for the exclusive culture of alfalfa.

Everything has been done to discourage the culture of hay and grain since 1909 for both the Sunol Valley and the Pleasanton Valley lands. It generally is agreed by the tenant, and provided in his lease just what he will grow. If a tenant has a lack of confidence some provision is made so that we share the risk with him. The lease may be on the share crop basis, and often the tenant is assisted in the way of irrigation, or the securing of seed, or whatever has to be overcome to make the crops succeed.

10,948

For the purpose of arriving at an annual depreciation fund in 1909, an effort was made to secure information from as many authorities on the subject of depreciation as were available; some of these were secured through Price-Waterhouse & Co., who were in touch with engineers in the East. Other information was secured by correspondence with engineers, and from what information was in print. The information sought was with reference to the life of structures similar in character to those in use by the Company, and the rates of depreciation. After a compilation was made of all the authorities found, studies were made applying the lives and rates of depreciation to the structures of the Company in order to get at the total annual fund. The method adopted was the sinking-fund method, allowing a rate of interest to be compounded annually, so as to provide a fund equal to the value of the structure in question at the end of its life. The studies made finally resulted in the adoption of an annual figure, which amounted to \$260,000 per year; it was made with the idea in view that that figure might be the subject for future adjustment after more careful study was made, and when more was known about the general subject of depreciation. The rate of interest used in those particular studies was at the rate of $3\frac{1}{2}\%$ per annum.

10,949

Mr. Bailhache: In the transfer of stock from the waterworks to the present company, in 1903, the entire 147,000 shares were sold at \$90 a share. The record of the Company's cash book shows that when that transaction was closed on the cash-book, there were two checks drawn; one check, No. 1, was for 139,987 shares, at \$90 a share, and then there was another check drawn for 13 shares outstanding at \$90 a share; that closed the entire transaction of the 140,000 shares that were bought from the Spring Valley Waterworks at \$90 a share, and for which the Spring Valley Water Co. gave their two checks. This matter I am talking about is simply the purchase of the old Water Company's shares, and when the Spring Valley re-organized, they bought 140,000 shares at \$90 a share on the books.

ONE HUNDRED AND FIFTIETH HEARING.

MAY 3, 1916.

Witnesses: GEO. L. DILLMAN for Defendants.

S. P. EASTMAN for Plaintiff.

F. C. HERRMANN for Plaintiff.

G. A. ELLIOTT for Plaintiff.

J. J. SHARON for Plaintiff.

F. P. MUHLNER for Plaintiff.

(Certain corrections noted in the transcript.)

10,951

Witness: GEO. L. DILLMAN for Defendants.

10,953

DIRECT EXAMINATION BY MR. SEARLS.

On pages 10,925-26, in speaking of my allowance of \$474,000 as a safety factor to cover any findings his Honor might make as to the use of the Calaveras and Arroyo Valle for protective purposes, I used the words "reservoir sites", whereas, on my direct testimony I stated that it would also cover the strategic advantage of acquiring the dam-site. In all those cases I think I was careless in the use of the term. When I made use of the words "reservoir sites" on cross-examination, I had in mind the dam-sites. The possession of dam-sites is of strategic importance, and they are frequently acquired long before the construction of dams, and the utilization of reservoir sites, and their possession puts the utility owning them in a position to condemn areas for flooding purposes which are quite different from possession of dam-sites themselves. The idea that I had in mind in that cross-examination was the possession of dam-sites which are very small in area compared to the reservoir sites flooded, and not the flooded reservoir sites.

Dillman

10,954

CROSS EXAMINATION BY MR. GREENE.

In the \$474,000 I had no thought of lands for flooding purposes at all. The \$474,000 is the segregation made to cover the protection along the streams and the possession of the dam-sites, which is the same as the possession of a pass by a railroad. The possession of a dam-site gives them control of the situation, whereas the possession of the land for flooding purposes is entirely different.

I did not make any attempt at a segregation, either as to the width of land bordering on the streams, or as to any specific amount that would be involved on the basis of any of the appraisals. It is simply an arbitrary allowance. The possession of the dam-site gives the utility owning it the right to condemn a reservoir site above; in the case of a contested possession of a dam-site, that matter has to be settled before the rights can be settled; in other words, a possession by

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10,956 one utility of a dam-site such as Calaveras would prevent another utility desiring to construct there from the acquisition of the lands above for reservoir purposes until they had acquired in some way the dam-site. I doubt if either the Calaveras dam-site or the Calaveras reservoirs should be included as a portion of the rating base, but the dam-site should be included first, at all events. The possession of that would give the Spring Valley the right to condemn the reservoir site at whatever value the Court found. It is a matter of opinion as to how much in advance of the actual utilization of the site for the purposes of water production it should be included in the rating base. It should be obtained prior to the desire of another utility to acquire the dam-site. For instance, that Calaveras supply is just as naturally pertinent to the Oakland water supply as it is to San Francisco, and the possession of that dam-site would prevent the Peoples Water Co. from getting that water supply, and its acquisition should, therefore, properly be made sometime in advance of utilization, and it is very proper to do so. I would not object to including that several years prior to its utilization.

If the Spring Valley Water Co. should have acquired the dam-site of Calaveras, and the Peoples Water Co. should have acquired all the reservoir lands, I think the Spring Valley Water Co. could show in court the inability of the Peoples Water Co. to utilize that water basin at all, and condemn it on the ground of superior use.

RE-DIRECT EXAMINATION BY MR. SEARLS.

10,957 In stating that it was good business judgment to acquire these sites in advance of use, it is a matter of doubt, in my opinion, as to whether they should be included in the rating base prior to the time in which they go into use, and I did not so include them directly, but have included them in this special allowance, if in the opinion of the Court it should be proper. The area is somewhat small, and while they could afford to pay a fairly high price per acre, the area being small, they are minor in the estimates, and relatively very unimportant.

RE-CROSS EXAMINATION BY MR. GREENE.

There were two hearings on that Haywards case before the Railroad Commission. I did not regard the valuation as a matter of great importance, and I made a valuation of the property without putting in depreciation, and stated that as the company had no returns for some twenty odd years in dividends, but that all the earnings had been put back in the property, I made no deduction for depreciation, and let it offset the entire amount of dividends. I don't know what this "Exhibit D" in the Haywards case is. I presume, since they speak of the absence of allowance for depreciation, that that was in the first hearing; then it would seem that it was desirous to use this valuation for other purposes. Another estimate was made in which I did allow

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for depreciation, I think, about \$16,000 on \$56,000 worth of pipe. No exhibit of mine had any going concern value in it.

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The following sounds very much like my testimony in the case of the Haywards Water Co. before the Railroad Commission:

"Mr. Sutro: You have examined the properties of the San Lorenzo Water Co., which are operated—are serving the town of Haywards?

"A. I have.

"Q. And have made a valuation of it? A. I have.

"Q. You are familiar with this exhibit, known as 'Exhibit D'?

"A. I am.

"Q. That was prepared by you? A. Yes.

"Q. And to the belief is correct?

"A. It is.

"Q. There is no allowance for depreciation in that?

"A. No."

I don't know what "Exhibit D" is, but if it contained any allowance for going value, my overlooking it was inadvertant, and I do not believe that I overlooked it, because the matter of going value was discussed very positively between the attorney for the company and myself, and I, at that time, believed that nothing should be added for going value, and I still so believe, and I put in no testimony in the case to the contrary. I don't know what "Exhibit D" is.

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I request that Mr. Oscar Sutro be asked to come here and testify as a witness in the case. I am very positive in my recollection about it. I did not then, nor do I now believe that going concern has any part in a valuation of this kind.

Witness: S. P. EASTMAN for Plaintiff.

Eastman

DIRECT EXAMINATION BY MR. GREENE.

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I have had prepared a map of the Merced Tract, showing the 811 acres to which Mr. O'Shaughnessy referred, and showing the acreages in that 811 acres which has been cultivated during the years in controversy in this suit, and some other matters.

(Map showing Merced Tract cultivation, etc., introduced and marked "Plaintiff's Exhibit 217".)

This map was prepared to show the partition lines outlined by the City Engineer covering the lands recommended by him to be acquired by the city in its condemnation suit; that land is outlined in red, and contains about 813 acres. The portion in green shows the present forested area that has not at any time during the period of this litigation, or since, been in cultivation. It also shows in this color the area overlapping the partition line of the City Engineer that has been in cultivation; this area is 3.6 acres, and is all westerly from the brick-

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lined intercepting canal that goes down through this tunnel. The only other area tributary to the south lake, which was the lake from which the water is drawn for the city, is a small area of 3.8 acres, making the total area tributary to that lake 7.2 acres. That is immediately northeast of the south lake. The area hatched in black, and shown in light green was cultivated to potatoes in 1910, but not fertilized; that is the area on the watershed of the north lake. There are two or three small patches on the watershed of the north lake, the most easterly of which embraces an area of 1.1 acres, the next one 2.8 acres, and the last one 2.6 acres, which have been cultivated during the period in this litigation on the lake side of the partition line; that is, they are within the drainage area of the north lake. There is a small parcel of 5.5 acres under cultivation which is outside of the watershed of the north lake, but within the partition line outlined by the City Engineer, where we provided a space for ingress and egress to the property proposed to be acquired by the city. These parcels are all on the north side of the north lake, and each one of these ravines that drains toward the north lake, and also to the south lake, have dams in them with diverting structures above the dams, which take the drainage off of the watershed.

Questioned by Master.

Those were built a great many years prior to the first year of this litigation, and have been maintained during the period in question.

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The water of the north lake is held in storage, and can be diverted into the south lake by a pipe which connects the two lakes, and which can be opened or closed, but as a general thing is kept open. Water does pass through; sometimes it passes from the south lake into the north lake, which is generally in the winter and early part of the spring, for the reason that the south lake has the larger watershed. If the lake is drawn down by diversion later in the year, the flow then changes from the north lake to the south lake.

DIRECT EXAMINATION BY MR. GREENE.

The acreage of 3 and a fraction acres northeast of the south lake was the only parcel on the watershed of the south lake during the period of this litigation, except one piece of 3.6 acres which I said was westerly from the intercepting canal that drains the water into the ocean. The surface drainage there drains into the canal. The character of the formation along the northeast shore of the lake is very much tighter than it is anywhere else around the lakes. The banks stand almost vertical, and there is less porosity and opportunity for filtration through the sands along this embankment than there is on the southern embankment, or on the banks of the north lake.

Mr. Metcalf: The sand was rather cementitious, not free and loose.

10,963

Mr. Eastman: The policy has been in leasing, on the southwest-

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erly end of the property, to keep all the leases on the south side of the drainage canal; any drainage which can come from the area occupied by the gardens has to drain to this catchment basin, which is isolated from the south lake by a dam built across the south end of the Merced property. The catchment basin is connected directly to the intercepting canal, which is a brick-lined structure a portion of the way, and then the balance of the way a brick-lined tunnel to the ocean, and it diverts any surface run-off of water that comes from this portion of the property into the canal, and thence into the ocean. The area immediately east of the southerly end of the south lake was leased about 1912. The cultivated area was kept well behind the diverting flume, so that there would not be any immediate drainage into the gulch that is there known as Ocean View Gulch.

The plateau between the north and south lakes, has, in the latter part of this litigation been leased as far down as shown by the light green on the map. The exterior boundaries there were kept well behind the immediate slopes to the lake, and the same is true of the leases north of the north lake. Those leases occupy from Junipero Serra Boulevard on the east, and Sloat Boulevard on the north, and occupy the strip down to the city's partition line where the property borders Sloat Boulevard. There are no leases on the portion of the area west of the lake, between the diverting tunnel to the ocean at the south lake, and Sloat Boulevard on the north. That is hardly suitable for agricultural purposes, and a part of it is off the watershed.

10,964

There never has been any surface run-off, even during storms, that we know of. That is, any direct run-off over the surface. I do not refer to infiltration, or to the drainage into the ravines which is carried off by the protective system.

In Ocean View Gulch the diverting dam is at the head of the gulch at a point north of the Ocean View Pumping Station; in the Ingleside Gulch it is very near the eastern boundary of the property, and connects with the drainage sewer that runs in a northwesterly direction, and takes the surface drainage off of the property.

Questioned by Mr. Searls.

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The cast-iron sewer is the one marked in red on the map; that was rebuilt by the city about 1912 or 1913. They wanted to connect it with the Ingleside system, as I recall it, and for that reason we required them to make it of cast-iron.

DIRECT EXAMINATION BY MR. GREENE.

With regard to the Pleasanton properties, my point of view is that the old holdings of approximately 1,000 acres in Livermore Valley and the Arroyo Valle were a strategic start at getting control of the water of the valley, but it was not by any means in the nature of a strong position. We could very easily have been made the subject of adverse diversion. It had always been the intention of the company to

acquire further lands in order to get further quantities of water, and it was in line of that further policy that the land holdings of the company were extended for the purpose of covering as far as possible the underground reservoirs. That group of purchases was concluded in about 1912, and the aim was to cover the underground reservoirs.

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The development of the Pleasanton properties for the diversion of water is a part of a general development scheme to also develop and use the waters of the Arroyo Valle watershed; by impounding the Arroyo Valle waters by a dam in the foothills, they would be used in connection with the Pleasanton waters; that is, the plan of development was to impound the waters at the Arroyo Valle, and to release them for infiltration into the gravels, and take them out again at a point near our present pumping station. In order to develop water at the Arroyo Valle Dam, it would be necessary to acquire further rights. It also is proposed, in order to increase the rate of infiltration, to spread the waters over a larger area than they naturally would traverse in going down the natural stream channels.

In acquiring the lands that the company now has, the purpose was to acquire such a strong position that it could bring about a reasonable settlement with any other land owners in the Livermore Valley who might really be affected by withdrawals. To bring about all conditions necessary to the complete development of this project, unless we had these properties in my judgment, we could not deal with these people; we could not bring about the complete development so economically as we could by virtue of the position which we now hold. At the present time we are negotiating with the Pleasanton Township Water District, and the directors of that district and the company have agreed on practically all of the details necessary to bring about conditions that will permit of this total development. Had the company sold the lands after acquisition, ex water rights, we could not, in my opinion, have completed these negotiations with the Livermore Valley people, which would have permitted the basis for the complete development of the lands; in other words, the ownership of the lands will serve as a valuable adjunct in bringing about the acquisition of further rights if necessary to a very much larger development than we could have counted on prior to their possession. When all of the rights have been secured by virtue of the position of the company in owning the lands there, it would be in order, and in fact is the policy of the company to sell what lands it can consistently with the development of water, and in which case the sale of the lands, will be a credit on the lands in use for the city; that is, whatever money is received for these lands will reduce the amount of the landed investment in use.

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CROSS EXAMINATION BY MR. SEARLS.

With respect to the Merced properties, the policy of the company in making these leases was to do it in a way that would not result in

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any injury to the waters of either lake. There is not any surface run-off even from the leased lands into the ravines. The sand formation is so loose and porous that all the water which falls on these lands goes through the land rather than over the surface. Our policy in leasing these lands is based upon advice that the organic matter does not get into the lake with the infiltration; that is, the sand acts as a natural filter, and takes all the organic contents out of the water.

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Questioned by Master.

That is my idea, based upon the advice at the time that we undertook to lease these lands. Mr. Metcalf has told me that there was probably an increase in the organic contents of the lake, but there was no increase in the solid contents of the water.

Mr. Metcalf: The analyses would indicate an increase of organic contents in the increased amount of the albuminoid-ammonia particularly, which gives evidence of recent pollution; if it is very recent, it shows in the ammonia, but if it is a pollution which is of less recent origin, it would show in the nitrites and nitrates; in other words, the successive stages of purification conform to the albuminoid-ammonia, nitrite and nitrate contents. It would also be likely to be shown in an increased amount of chlorine, due primarily to the urine; of course, on the sea coast chlorine contents are much higher than further inland, but if there were marked increase, it would show in the analyses.

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These chemicals, in themselves, constitute the organic content of the water, and furnish very good plant food, which in turn tend to stimulate the activity of the lower forms of vegetable and plant life; then when they putrify they in turn tend to increase the organic contents of the water. The trouble comes primarily with the introduction of varying masses of organic matter; of course, this creates the low forms of animal and vegetable life, and the weeds in the water itself are not injurious. The difficulty comes when your aquarium, and any of those forms of life die and putrify; then, of course, your water is not so good. You have seen the action clearly in an aquarium, where, if the plant life is well balanced, the water is perfectly clear and pure, but if it is out of balance, the water becomes murky, which is due to the dying of some of the plant life, and the fouling of the water. That may clear itself again at a later period. The difficulty is that when you introduce varying amounts of organic matter of this sort into a basin of that sort, with varying quantities of water in the basin, and varying water levels, it is hard to maintain a constant balance in the natural forces at work therein.

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CROSS EXAMINATION BY MR. SEARLS.

Mr. Eastman: It has never come to my attention that there is any difference between the water of the north lake and the water of the south lake, in so far as the organic contents are concerned.

In leasing, it has been regarded as a little more important to keep further back from the direct drainage lines and embankments of the south lake than the north lake, though in the case of the north lake the boundaries of the lines are kept well behind the top slopes of the embankment.

Referring to the map, and more particularly to the area south of Sloat Boulevard, lying between Sloat Boulevard and the north lake, the leased land runs substantially to the partition line as surveyed by Mr. O'Shaughnessy, with the exception of the three small parcels indicated in light green; those were under lease prior to the time of the survey by the City Engineer.

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It is also true of all that portion of the watershed lying to the west of the Junipero Serra Boulevard, and the crest of the hill above the easterly shore of both lakes, to this extent: That with the exclusion of the two small parcels indicated—the parcel marked 3.6 acres, and the parcel marked 3.8 acres—and that are within the watershed of the south lake, that all other leases are away from the partition line laid down by the City Engineer. The City Engineer's line of demarcation did cross the peninsula between the two lakes practically at the head of these lakes, as shown on the map. The areas marked "A" on the map were cultivated, I believe, in 1910, but it was not fertilized in that year. I believe there has been fertilizer on that tract since July, 1915.

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If the lands were to be disposed of and sold outside of that partition line, I presume the selling of them for residential purposes would be the most profitable market. My own judgment would be if they were sold off for residential purposes that the danger would be very much in excess of the present danger of pollution under agricultural cultivation; if human habitations were brought on to the watershed so as to cover the entire area outside that line, I should think the hazard would be very substantially greater.

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As soon as the land was subdivided and sold, the aim would be that all of the lots would be built upon, and that has been the aim of the owners of such projects to the west of Twin Peaks, starting about 1910 with the Ingleside Terrace development. I do not think that the period 1907 to 1915 would have resulted in a very large development out there, under the conditions prevailing for that particular period. If the company should run a fence around the boundaries of the excluded land, trespassers could be kept away from the borders of the lake, but I should think that very large expenditures would be necessary in order to protect the lakes in the way of sewage system and diversion works over and above what now exist there to make it practicable to use the waters of the lakes, and also to permit that extent of human habitation so near the lakes. I have in mind the condition of the water at Lobos Creek. It is very badly contaminated with typhoid-carrying bacilli. The water in Lobos Creek is very much clearer than the water in the Merced Lakes, and there is not at Lobos Creek any

surface run-off at any time of the year; that water all comes along the creek through infiltration. The general character of the watershed is the same as the character of this watershed. It has the general character of development and habitation on the watershed that you have asked me to assume in this case. The contamination at Lobos Creek is undoubtedly the result of broken sewers throughout the Richmond District. The houses there which are built on the edge of the ravine through which the stream runs are all, of course, connected with the city sewer system. The water of Lobos Creek was very badly contaminated before these houses existed so close to the creek. I think that substantially all of the development north of Lake Street is in the past seven or eight years.

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This typhoid pollution took place a good many years ago. I know that we had bacteriological examination made in 1908, and it showed a very high state of contamination. I do not believe there are any restrictions in that part of the city, other than the standard sewer system the city has in other parts of the city. The waters of Lobos Creek are fed into it all the way down the stream from the sands, starting at the Marine Hospital, and going toward the ocean for about a mile. Samples were taken at the various springs that feed into the creek, and they were all found to be very badly contaminated. That creek is fed by seepage which you cannot distinguish all the way along the creek, except in some cases where a good deal more water comes out than at others, and sort of bubbles up and indicates the existence of springs underneath the flow line of the creek. Substantially all of that water comes in from the Richmond side of the stream; there is practically nothing that comes in from the Government side, and that was one of the reasons the Government has always been so anxious to acquire the company's half of the stream.

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It is pretty well established that there are very much larger quantities of water that percolate into the creek at about Fourteenth Avenue; from Fourteenth Avenue toward the ocean there is water that comes in all the way along, but not nearly so much as in that immediate vicinity; a very large percentage comes in from about Tenth Avenue to Fourteenth Avenue.

I don't know, from my own knowledge, where the springs are that feed Lake Merced. Mr. Schussler has told me that he believes that the greatest infiltration is in the vicinity near the suction pipe that leads to the pumping station, as shown on the map by that black line in the south lake. The company, to my knowledge, has never definitely located any particular springs in the lake bottom. I understand that the City Engineer, in laying out that partition line, laid it out as the location for the construction of a boulevard to have deep gutters to act as an intercepting structure to take any drainage that might be on the surface, and he also laid out the partition line on grade, so that all the catchment intercepted by the boulevard and gutters would be

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carried off by the watershed. I presume that he had in mind that in excluding these outside lands the streets would be paved, and that under conditions of modern improvement, what now percolates underneath the surface would present itself on the surface of the land; of course, it is in the power of the city to put in devices and use precautions in the way of the character of a sewer system that would not be within the power of a private corporation doing the same sort of work. I also understand that it is his plan to use these lakes entirely as an emergency supply, and not to draw upon them except in a case of emergency. Under present conditions you would be required to use them until water is brought in from the outside. When structures are built into the city to bring water in from the outside, it will probably be cheaper to use the outside water than to use the water from Lake Merced.

I would not go so far as to say that the city authorities would refuse any legislative protection to the water supply. I think undoubtedly they would lend aid in such protection, but they did not do it in the case of Lobos Creek. I know that we had some difficulty in getting the city to agree to put in a cast-iron sewer line in place of the one shown in red on the map; that was some years ago.

With respect to the Pleasanton lands, at the time the litigation was started by Mr. Lilienthal and others, the company did not, to my knowledge, ever consider the proposition of condemning the water rights at Pleasanton. I am familiar with the acquisition of the lands other than the Sugar Company, and the Lilienthal lands. We did not believe that it would be economical to condemn the water rights. That question was discussed, but never was made a matter of any great importance, because it did not seem that we could bring about conditions that would make possible the complete development of the Pleasanton Valley, and Arroyo Valle, and do it so economically that way, as it could by acquiring lands. By the acquisition of these 4,000 additional acres I believe we very substantially increased the ownership of land overlying the subterranean body of water, and we also acquired the lands necessary for that surface drainage of the lands north of Arroyo Valle Creek, as well as a substantial area east of our present holdings. What I refer to there is the necessity of a future agreement with the people east of our holdings in order to bring about a condition that will protect them as well protect the position of the company, and make possible the development of the Arroyo Valle and Pleasanton system, which are one.

Immediately on the acquisition of these lands, larger equipment was installed at Pleasanton that permitted of a greater draught; a greater draught was made. I do not think any agitation was made as soon as we made that draught by the people to the east of our Pleasanton lands to have the draught stopped. I do not think any agitation began until in 1913, and that was brought to a head by a

succession of two dry years. In addition to the withdrawals of the company in 1913, the Arroyo Valle Creek never had water flowing in it as far as this junction with Laguna Creek; that is, the Arroyo Valle Creek has a watershed of 160 sq. miles, and there was not enough water produced in that watershed to carry the surface flow as far as Laguna Creek, and everybody in the valley complained about crop conditions that year. I always thought they magnified the importance of the diversion of the company as compared with the character of the years that they had gone through—two dry years.

Two years after we acquired these lands they formed a water district there, incorporating some lands east of the holdings of the company, and for the past six months we have been negotiating with these people, and the director of the water district, and the representatives of the company have agreed upon a plan of settlement. That plan does not contemplate the purchase of additional lands to the east.

Mr. McCutchen: I was familiar with the Lilienthal transaction, and I know that it would have been impossible to have acquired from Mr. Lilienthal the right to drain these lands. That is my conclusion, based upon a very intimate knowledge of the situation. Mr. Lilienthal had brought that suit against us, and the Sugar Company was contemplating a suit. I know that through statements made to me by John L. Howard, who was president of the company, and the feeling of those two interests was such as that I have no doubt that it would not have been possible to have acquired the right to drain those lands. I do not think that it would have been possible to have made any agreements with those two interests for the lowering of that water plane. No attempt was made directly to make any agreements, but the attitude of the two interests was such as to convince me about the fact that they considered the maintenance of that natural water plane of such value to them that it would not have been possible to have made any arrangements for the acquisition of the water rights as distinguished from the land itself.

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The matter of condemnation was the subject of discussion, to some extent, but it was the consensus of opinion that that would have been a very ill-advised course for the company to pursue. We felt that the effort to take that water right separate and apart from the land itself would probably result in the company being compelled to pay substantially what the land was worth.

CROSS EXAMINATION BY MR. SEARLS.

Mr. Eastman: Since the acquisition of the lands we have not made any efforts to sell. We did not think it wise, in view of the fact that we wanted to bring about a complete settlement that would permit of a very much larger development than we now have there. I do not think they will be sold until the company has acquired such rights as are necessary for the complete development; when that is

done, I think the policy of the company will be to sell such parts of these lands as it consistently can.

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We are undertaking to agree with the farmers to the east of our holdings with reference to such provisions, with respect to the water plane, deliveries of water, and so on, that we would not feel that we could possibly do if we did not actually own lands below them. That is, if these lands were open to acquisition and diversion, by other people, we would not feel that we could obligate ourselves to meet conditions that might be altered by other people; occupying the position which we now do, we can assume with safety that nobody else can divert water away from that territory in commercial quantities, and therefore, we are willing to undertake obligations that it would not be possible for us to do if we did not occupy that position. If we owned all the water rights beneath the lands in question, except the amount of water that was immediately necessary for the natural irrigation of the overlying land, we could, to a certain extent, prevent any diversion of that water to outside uses, but even so, we would not occupy the position which we now do.

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We have leased all of the land that is available for cultivation, except such areas as are occupied by canals, or that are not fit for cultivation. I have no idea of the area which has not been leased, except it is that made up by roads, canals and creeks. I don't know of any land at all that is suitable for cultivation that has not been leased continuously since the acquisition. None of the leases of lands north of the Arroyo Valle Canal have the 60-day cancellation clause in them. The policy is now to rent those lands without the revocation clause, but subject to the existing condemnation suit by the city, which was filed December, 1913. Practically all of these leases, except the Heath lease, which covers about 298 acres, and a lease to Wenig, of a small parcel of about 40 acres, have been entered into since that date.

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All of the lands were leased as we got possession; in some of the purchases the land had to be acquired subject to use by the seller for a certain period, and that was the case in the purchase of the Lilienthal land.

In referring to the subject of rentals, I would like to make a correction to my statement of yesterday; I gave an area of 4,641 acres, and stated that it did not include a small area near Santa Rita. I was referring to another memorandum. I find that this was 4,641 acres, and the rentals therefor, which I stated yesterday are for all the lands north of the Arroyo Valle Creek. I believe that these lands as an agricultural proposition are paying as much as the taxes and operating expenses. I don't know the exact figures on that, but if you mean by operating expenses a pro-rata of the agricultural department as would pertain to these lands, they undoubtedly are paying more than the taxes and operating expenses, and they were doing that during all the years since the Company owned them.

The sum of \$260,000 depreciation allowance was arrived at as a result of various conferences between Mr. Bourn and myself, and other people of the Company. The final authority, so far as the Company was concerned, was authorized by resolution of the board of directors. My recollection is that the resolution of the board of directors only refers to it as a fund, and specifies the amount of that taken as \$260,000. 10,986

At the time that was arrived at there was very little information on the subject of depreciation. What we did was to get all of the available information from the best authorities at that time, and computations were made by different methods, using different lives, and so on, and as a result of the various studies that were made, this seemed to be as near a proper fund as we could arrive at at that time. After these various computations and studies were made, the one which was made on the sinking-fund basis seemed the best to meet the conditions, and it was adopted for that reason. I think, as a matter of fact, that I computed most of the details that went into the fund. Mr. Elliott assisted me at that time, and we used all of the available information and the authorities with reference to lives of structures that we could get, but the actual computations I think I made myself. I made these computations on the sinking-fund basis, at $3\frac{1}{2}\%$ per annum, and arrived at \$260,000. 10,987

The statements that I am making here are with reference to the way in which we arrived at the original figure; that was just a start; no computations have been made with reference to the original figures; since that time studies have been made that seemed to verify that as a proper amount, but we did not rely on the original computations any more than to give it a start at that time. 10,988

The sinking-fund method was used in order to get what seemed at that time, in view of the information available, a proper fund, and then a resolution was passed by the directors which recognized the amount of the fund, and I believe the resolution has been passed each year since then, and has only addressed itself to the fund as an annual allowance for depreciation in closing the books for the year.

When the original computations were made, that was prior to Mr. Herrmann's connection with the Company, and Mr. Elliott did not make, to my knowledge, any computations of the entire amount; he assisted with reference to some of the operations of it, but I am responsible, really, for the details that go into the entire fund, or went into it at that time. I have not made any computations since then. The purpose, originally, was to arrive at what seemed in the aggregate to be a proper allowance, without any idea of continuing, with reference to the way in which that was made up, unless it should be confirmed by studies in the future. That is, we did not believe at that time that we were correct in all of the de- 10,989

10,990 tails. In arriving at that fund, the subject was too young, and there was too little available to do that, and after that no recognition was given at all to computations that went to make it; it was just recognized as the total amount that upon the advice of other engineers seemed to be confirmed. We did not carry forward at all the original computations that went into it. We were advised by other engineers that at least that amount, in their opinion, was necessary, and the authorization was made by the directors in accordance with that advice. That fund is re-invested in the property. The principle was not to set it aside, but to re-invest it.

We wanted to use what seemed to be the most adequate method at that time, and various computations were made, and the one adopted seemed best to meet the conditions. We have not pursued the subject since that time with reference to all of the details that went into the computation of it at that time. We have simply advised with other engineers, upon whose advice we have relied with reference to the total, and I do not recall that that advice was made upon particular methods, or not. The action of the directors was addressed solely to the amount.

10,991 Mr. McCutchen: With reference to the Lilienthal litigation; that litigation was for the purpose of obtaining an injunction restraining the Company from interfering with the natural water level, and one very important consideration that influenced the representatives of the Company in acquiring that property was that it was being very ill-advised to proceed with the trial of the case and make a showing of the quantity of water which we thought could be withdrawn from that basin. We thought that would have the effect of enhancing in the minds of the owners the value of the other lands, and would result in making it very much more difficult for us to acquire those lands; in other words, that it would have been inviting more trouble. That suit was a suit to enjoin the diversion of the water which the Company was then diverting; the relief prayed, of course, was permanent in its nature.

10,992 Mr. Metcalf: Apropos of that map there, and our discussion as to the inclusion of this Merced ranch in the lands in use: The portion indicated properly as the land in San Mateo County is desirable for the protection of the supply from this point of view, that the more thickly settled district outside of this area lies to the south or southeast of the property, so that the protection is somewhat greater. I suppose it is true that some portion of the water which comes in that area underground may filter into the ocean, and to the extent that that is true, perhaps, these lands are not quite so necessary as the lands that lie to the east of the lakes. It is also true that in-so-far as the slope of these lands is towards the lakes, that of the lands on the south is more gradual, and they are not quite as necessary as the lands that lie to the east of the lakes on the boule-

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ward and shore line; of course, the drainage system affects merely surface run-off, and that hasn't a direct effect on the underground flow.

Mr. Sharon: The sewer from Ocean View that goes into that supply basin is cast-iron for a part of the way, and vitrified clay for the rest.

Mr. Metcalf: I take it that the idea in excluding that, and maintaining this dam between it and the south lake was to take care of such surface drainage as got into it; whether the character of the basin itself, and the water in it, was different before the construction and maintenance of that dam, I really do not know. There might have been more organic matter there, and perhaps it is excluded on that account.

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Mr. Sharon: I think the dam was put there for the purpose of diverting the water at that level into the canal so that it would go into the ocean, and there is a small reservoir which may act in a small way as a compensating reservoir to take care of storm storage, over the capacity of the brick canal. I doubt, though, whether it has ever been put to that use. I think the canal is large enough to take all the surface flow there.

Mr. Herrmann: That sewage goes clear to the tunnel; it does not empty into that pond. It is carried right over the pond in a trestle, and is carried in a pipe, surrounded with a box, all the way to the mouth of the tunnel, and is not at all connected with the water.

Mr. Metcalf: Any little stream that came down would flow in there, but not with this depression. There is surface drainage down there; otherwise, there would not be a pond, and you would not build your diverting works either. If there is any injurious matter in that surface drainage, it might, to a limited extent infiltrate into the lake. On the other hand, this wash-down in streams of that sort is very fine, and tends to make the bottom of the lake tighter than it otherwise would be. The tendency, I think, there would be to find less flow from that pond directly to the lake than I should expect to find on the sandy strata on either side of the lake. The water would be carried through, if there were any amount, through the channel, and sent to the sea. My point is that that is useful, because otherwise if filled with human habitation there would be a greater chance of pollution of the lake.

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Witness: F. C. HERRMANN for Plaintiff.

Herrmann

DIRECT EXAMINATION BY MR. GREENE.

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I have investigated, and prepared a table of the records of pumping at Pleasanton. I covered from the beginning of our records, which was the middle of 1912 to the end of 1915. I prepared a table

10,996 on which is shown the draught from Pleasanton, and from Sunol, for those three years, and have shown at the bottom of this table the average for the year, and the average for the first six months, and the average for the second six months, because the high draught is made from Sunol in the first six months, and from Pleasanton the last six months, and the two are operated together always. This shows the segregation between the Pleasanton flow and the Sunol flow. That segregation is determined by taking the Alameda flow at the Brightside Weir, and deducting from it the Pleasanton flow, as measured at the Water Temple.

Questioned by Master.

There is a measuring device at the Brightside Weir. The Brightside Weirs were not used prior to 1900, and draught has been taken from the Alameda system since 1888, which explains why I have given in other cases the measurements at Pleasanton.

DIRECT EXAMINATION BY MR. GREENE.

10,997 I have investigated the increase in the assessments of lands riparian to San Mateo Creek at the time the rights of the Company were acquired, and the increase in the assessed value of those lands in 1913 is 703% over the assessed value in 1888. That includes all of the land as it now is.

10,998 The Pleasanton Pump No. 2 was constructed in the middle of 1913, and it pumped from the 19th of August to the end of the year in an intermittent way; in other words, it was a new plant, and there were a number of mechanical troubles that occur with all new plants. During August it pumped something less than 3 million gallons daily. In September it pumped something over 3 million gallons daily; in October something over 3 million gallons daily; and in November nearly 4 million gallons daily, and in December about 4 million gallons daily. We had no way at that time of measuring the water that was pumped from Pump No. 2, separate and apart from that which was pumped from Pump No. 1. They both run into the same pipe, and were both measured together at the Water Temple, at Sunol. The capacity of the pumping station was believed to be in the neighborhood of 5 million gallons a day, and it was about that in my judgment, which was obtained from observation when one pump was running without the other. The reason that these amounts are less than 5 million gallons daily is due to mechanical troubles with the air compressor and the air line, and with the submerged pipe, and various things that enter into that pumping plant. The pump was not as efficient as we hoped it to be, and we have been working on it considerably since, and have improved the efficiency of it a great deal, so that at the present time its pumping capacity is about 7½ million gallons daily. In 1914 it was about 6½ million gallons daily.

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The Ravenswood Pump was completed in December 16, 1912. We tried it out, and had trouble with the bearings, and some of the electrical equipment, and made tests at various times up to January 18, 1913. We started to pump on that date and broke the casting of the upper half of the casing of the pump, and we tried to have that welded locally, and started pumping again on January 28th with the welded casing, and that failed, and then we had to order a new casing from the East. That arrived and was put in place, and tried out on the 28th of March, 1913, and the pump operated from the 29th of March to the 8th of April, and it was found to be more efficient than we had anticipated, so that it was necessary to throttle it in order to eliminate danger from the pipe line back of it, because it was right on the pipe line, and we could not have a vacuum on the suction end of the pump. So we stopped the pump and turned the impeller down from April 8th to the 11th, and then we operated the Ravenswood Pump from April 11th to May 23rd, with a few interruptions that were unavoidable, but the impeller was still too large, and we tore down the pump and turned it down an inch and a quarter more, but in doing that the result was not satisfactory, so that we had to get a new impeller made for it, and the pump was idle from then until December 26th, because after we got the new impeller the water drawn from the Alameda system was not in excess of the pipe line capacity without the booster pump. The pipe line capacity without the booster pump is about 16 million gallons, and with the booster pump about 21 million gallons daily.

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CROSS EXAMINATION BY MR. SEARLS.

I have not checked these Pleasanton readings with the data that Mr. Lee put in, but I think they are the same, because we have both been working with the same records. The draught from Pump No. 2 is my approximation, and I don't know that anyone has that, because it is only an estimate.

A discrepancy in the tenths of million gallons would be natural, because I did not use 1,000-gallon tables and divide them through; it is just a case of working with million gallons daily, and probably I am not closer than one-tenth.

11,000

Pleasanton Pump No. 2 ran continuously during the latter part of 1913, except for the interruptions that were necessary by reason of mechanical troubles, and while it was running, it ran in capacity greater than that given; the reason that I have given these figures less is because it was not running to full capacity continuously. These figures here are merely an estimate based on the known capacity of the pump, and the total amount pumped by all the Pleasanton wells during that period, from the records that we have of the times that they ran, and from my personal knowledge, because I was over there a great deal during that time.

These figures on the assessments were taken from the assessment roll of San Mateo County.

11,001 Questioned by Mr. Greene.

11,002 I got the data as to the depth to which Well No. 177 fell in 1913. This well, a mile west of Livermore, dropped 50 feet. It is within the Pliocene Gravel, or the Oak Knoll tight formation, as given in Mr. Williams' report to the City, and which has, I think, but a very indirect relation to the water plane in the gravels from which we draw water. A number of wells in the same general neighborhood show that the drop of that water plane was a maximum of about 30 feet instead of 50 feet, the latter wells being located in these gravels from which we draw water.

Well 115, which is just north of Livermore, and in the upper gravels from which we draw water, dropped 8.2 feet between May, 1912, and December, 1913. Well 105-a, just west of Livermore, dropped 24.7 feet between August, 1912, and December, 1913. The record of that well does not go backward from August, and so I have taken the measurements in August. Well 116, which is in Livermore, dropped 31 feet from May, 1912, to December, 1913. Well No. 106, just east of Livermore dropped 24 feet in that same period. Well 103, which is $1\frac{1}{2}$ miles west of Livermore, or about half a mile from Well No. 177, dropped 21.9 feet from May, 1912, to December, 1913.

11,003 Mr. McIntosh: Well 177 is the only one within the area affected, as delineated by Mr. Lee.

11,004 Mr. Herrmann: Referring to Well 177: I think there is very indirect connection between that and the Pleasanton gravel withdrawal, because of the fact that it is in the Pliocene Gravels, and that withdrawal from the Pleasanton pumps, as indicated by the other wells in that neighborhood, shows it is not in synchronism with these wells. That material called Pliocene Gravel is not so porous as the other; it is gravel, but it has more clay in it, and while it contributes to this water indirectly, because of the character of the formation it would not be affected by this withdrawal in the way indicated. As you go from the other wells to which I referred toward the Pleasanton Pumps, the depletion was less, so that the depletion would range from approximately 30 feet downward to a very few feet. Well 177 does not represent in any way the amount of the depletion of the water plane in that territory, because these other wells that I have indicated all show much less, as I say, a maximum of 30 feet.

11,005 Questioned by Mr. Searls.

I have not quarreled with Mr. Lee in regard to that, although Mr. Lee did make the statement that one well did drop 50 feet, which is a fact, and likewise, Mr. O'Shaughnessy. The diagram introduced by Mr. Lee showed a drop of 30 feet in that vicinity, with which I

SPRING VALLEY WATER CO. VS. CITY AND COUNTY OF SAN FRANCISCO

agree, but on the other hand, the exhibit which Mr. O'Shaughnessy put in shows a drop of 50 feet, as we have it here, with which I do not agree. The 50 feet drop I contend has no relation with the draught at Pleasanton, and the 30 feet has.

I do not think that the water plane slopes directly from Well 177 down to our pumps. I think from the very fact that this dropped 50 feet, while the wells in the same vicinity have only dropped 30 feet, shows that is not true over the same period of time. There is a windmill on the well, and there may have been local pumping, and in this tight formation very little draught will draw down the pumping plane to a great extent right at that well, as happens in a number of wells that are in the tight formation. If there were not any draught from the windmill, or some such local source in the tight formation, it might well be that the well I speak of shows a less depletion than the wells near it, so that I would conclude from that that it would be hardly possible for the draught within a contour line to be greater than shown on the contour line by reason of the Spring Valley pumping. In other words, the withdrawal down here at Pleasanton could not make a depression up here near Livermore.

11,006

Mr. McIntosh: Referring to Mr. Lee's map No. 3, it shows there 30 feet, and a red line all around, and inside that is Well No. 177. The explanation of that is that the water table in the neighborhood of 177 stands at a much higher elevation than it does anywhere down below, and while it is apparently a hole, it is simply a greater drop.

11,007

On October 1, 1911, Well 177 was at an elevation 389 feet, and the elevation of the ground surface is 436½ feet, practically; on December 9, 1913, the water surface stood at 340 feet in Well 177, and incidentally, that is not the maximum drop. In October it is about 15 feet lower than the maximum drop would be.

(Counsel for Plaintiff stated that he would take the unsworn statement of Mr. McIntosh as evidence.)

Witness: G. A. ELLIOTT for Plaintiff.

Elliott

DIRECT EXAMINATION BY MR. GREENE.

11,008

I have a tabulation with regard to the Calaveras hauling costs. It is simply an assemblage of a record that is already in. That is, the hauling costs for 1913, I think, have been put in several times, but the hauling costs for the month of November, 1915, have not been put in. The second page shows the total cost of operating a motor truck hauling into Calaveras from various points, and hauling various materials, and the cost is worked out in the form of so much per ton-mile.

11,009

(The tables referred to are as follows)

CALAVERAS HAULING—1913.

Distance—9½ miles.

Cement contract price \$0.28 per ton mile. Contractor loaded trucks and Spring Valley Water Company unloaded. Unloading at Calaveras cost, at \$2.50 per 10 hours, \$0.27½ per ton. The cost of handling cement from Milpitas to Calaveras Dam under this contract was:

Loading and hauling per ton, 9½ x 28.....	\$2.66
Unloading per ton.....	0.275
	<hr/>
Total per ton.....	\$2.935
Total cost per ton mile—\$0.309	

Lumber contract price for hauling only, was \$0.30 per ton mile. Contractor loaded lumber for \$0.25 per ton and the Company unloaded at the Dam.

Hauling per ton mile.....	\$0.30
Loading per ton mile.....	0.0263
	<hr/>
Total	\$0.3263
Company unloading charge (estimated).....	0.0263
	<hr/>
	\$0.3526

HAULING TO CALAVERAS BY FIVE-TON WHITE MOTOR TRUCK

November, 1915.

9 Miles From Milpitas				16 Miles From San Jose				21 Miles From Niles				25 Miles From Newark				
Tons T. M. Cost				Tons T. M. Cost				Tons T. M. Cost				Tons T. M. Cost				
*Lumber	84	756	\$261.25	34.9c	34	544	\$192.50	35.4c	4	84	\$27.50	32.7c	4	100	\$27.50	27.5c
Cement	29	261	68.75	26.3												
Barley	16	144	55.00	38.2												
Transformers	12	108	68.75	57.4												
Miscellaneous	9	81	41.25	45.7												
All Materials.....	150	1350	495.00	36.7	34	544	\$192.50	35.4c	4	84	\$27.50	32.7c	4	100	\$27.50	27.5c

*NOTE: 1484 T. M. Cost \$508.75=34.6c per T. M.
 Truck cost \$27.50 per nine hour day.
 All loading and unloading done by Spring Valley Water Company.
 Cost of loading and unloading not included in above schedule.

11,011

In order to indicate the extent of the complaints in regard to the character of service in certain parts of the city, I have gone over all of our records. We have a complete record of every complaint that is made, which states the purpose of the complaint and the remedy, and whether we were able to fix it or not. I have taken the summer months of the year 1911, 1912, 1913, and 1914, because that is the time when we get most of our complaints. In August, 1911, we received 103 complaints, of which, when we investigated them, 26 were due to low pressure in the mains; that was the highest month of that year. At that time the Company had 58,858 service connections. In July, 1912, we received 130 complaints, 38 of which were due to low pressure in the mains. In that year we had 60,619 service connections. In September, 1913, we received 110 complaints, 45 of which were due to low pressure in the mains. In that year we had 63,016 service connections. In July, 1914, we had 80 complaints, 25 of which were due to low pressure in the mains. In that year we had 64,493 service connections.

11,012

This tabulation probably does not include all of the premises that suffered from low pressure during that time.

11,013

In the Richmond District the location of the complaints was at that time west of 33rd Avenue and North of Anza Street; that is about 10% of the Richmond District. In the Sunset District we received in 1913 and 1914 complaints from 8 houses on the higher levels, and that involved all the complaints. In Carville, which is down below 41st Avenue, in the years 1912, 1913, and 1914, we received numerous complaints from single premises. That is, they were repeated. In all they amounted to six different places. Carville is out by the Beach. The only complaint we received from Bernal Heights was due to the fact that we were forced to discontinue service there in part, I think it was in 1911 and 1912, by the construction of the Mission Viaduct. Bernal Heights during that time was supplied directly by Precita Valley Pumps, and the upper levels of Bernal Heights were out of water, as the old wooden viaduct was being torn out at that time, and there was no place to put a water pipe, so we had to take it out of there pending the construction of the new concrete viaduct. That pipe was replaced immediately on the construction of the viaduct, and up to within the last few months we had no complaints from Bernal Heights. There were probably about 30 houses affected. In the vicinity of University Mound Reservoir there are three houses that are on College Hill supply that on extremely hot days during the daytime probably get no water at all until night time.

Of course, in speaking of the service I am talking about now, it involves only domestic service. It has nothing to do with the size of the mains, or anything of the kind. We get many improvement club complaints about fire service, and all that sort of thing, but this

is simply domestic service. Another point I might mention here is that these complaints are the index as to the condition of the distributing system, and as soon as we receive complaints an investigation is made. If it is possible, we remedy the thing permanently, so that this list of complaints I have given here do not keep occurring time after time; they are generally fixed up. In 1911 we received many complaints from the top of Potrero Heights, and we installed a tank and supplementary pipe there, giving those people service. There was probably a period of two months when there were 100 houses that had very poor service excepting at night time.

11,014

CROSS EXAMINATION BY MR. SEARLS.

11,015

We have communications from improvement clubs, and about 75% of them are due to the fact that the street is being paved, and they would like to have the size of their mains increased; it is not due to shortage of water. As far as the upper regions of the Sunset District are concerned, the Sunset Improvement Club was asking for a water service, as they had no service at all. There were no pipes within a mile of them. There were about 19 or 20 people scattered through that region there that wanted us to install pipes, and they had the City Engineer make an estimate of what it would cost to install a part of the Hetch-Hetchy system in there from \$20,000 to \$22,000, and they decided not to put these pipes in on account of the expense. I believe that the City gave them a watering cart and they got water from one of our hydrants which was delivered to them in barrels, and one thing and another of that sort. We made no charge for that water.

11,016

The line built through the Park was to reinforce the Richmond District supply, and the supply down near Carville, and at the same time that the line was put through we acquired the Forest Hill system, and ran the necessary pipe to give the 19 or 20 people in the upper levels of the Sunset, water, but up to last summer those people had no pipes in front of their places at all.

The Exposition supply, to the best of my recollection, involved the construction of a pipe from College Hill Reservoir, at an estimated cost of \$250,000, which would have been of absolutely no service to us in the future, and the estimated revenue from the Exposition is something like \$160,000. It is my impression that it was more or less of a business transaction. Of course, the Exposition Company dealt with Mr. Bourn and Mr. Eastman, and I cannot say just what the final result was, but it is my impression that it was a matter of expense which caused the Company to state that they could not undertake the business of supplying the Exposition with water.

11,017

I don't know that the officials of the Company ever made the direct statement to the Public Utilities Committee of the Board of Supervisors that they would take on new consumers if that commit-

tee would direct them to, but that the responsibility of the risk of the water shortage would rest entirely upon the shoulders of the Supervisors, but I know that as far as the general question is concerned it has often been said by the Company in communications to the Supervisors that the water they had available through the present supply mains was inadequate to meet the needs of any considerable extensions without further construction.

- 11,018 The complaints that I have come in contact with, so far as real estate men are concerned, are mainly complaints that the Spring Valley Water Co. will not lay a system in their tracts without charge to them, and assume all of the risks of financial burden incidental to the slow settling up of their subdivision. Those are the principal complaints, because real estate men have gone ahead and piped their own tracts, and hooked them up to their system, and we have supplied water to them. I would not go about it in the way of saying that the Company did not make main extensions until enough people have settled in a district to absolutely have their return all ready for them. You take the case of the Parkside, for instance, that was developed in 1905; if the Spring Valley Water Co. had gone ahead and piped Parkside, the revenue from the settled up portion at the present time would not have begun to pay the carrying charges on that pipe. In other words, if we went ahead in an indiscriminate manner, the Company would probably be in the same position as the People's Water Co. is in today. I cannot state the policy that the Company should follow in making extensions; that is in the hands of the executive department.
- 11,019

- As far as the opening up of new tracts are concerned, no company, of course, should be called upon to make a large investment which is purely speculative, and the only way of accomplishing the opening up of tracts is by having the owner of the tract put in a system, and make some sort of a satisfactory financial arrangement with the Company to take it over in the future. That is the way that it has worked out in other cities, and it would probably work very well here.
- 11,020

In this hauling table, in which I show a hauling charge of 26 cents per ton-mile for cement, that was over the main highway into the valley from Milpitas.

Sharon Witness: J. J. SHARON for Plaintiff.

DIRECT EXAMINATION BY MR. GREENE.

At page 6733 of the record there was a matter in reference to whether an item of cast-iron pipe on the Channel Street Trestle had been included in the joint schedule on the cast-iron pipe. It did not seem to be clear in the record at the time that the pipe was ex-

cluded from that particular page in the inventory, and included as a whole with the cast-iron pipes in the three districts; as a matter of fact, it was an oversight that it was not distributed on that page as well as on the three pages in the three districts, but it was a small item of \$300 or \$400, so that in the joint exhibit the cast-iron pipe on this trestle was left off of the sheet. I am referring to "Plaintiff's Exhibit 126", page 338.

11,021

Referring to the Francisco St. Reservoir, a portion of the embankment, and a portion of the spur of the hill into which the embankment of the reservoir is built, encroaches upon the northerly 100-foot strip of the Francisco St. lot, about at the westerly end of the property. I should say roughly about half-way from the middle of the tract to the Larkin St. or westerly end of the property. It varies from approximately 100 feet south of the property line in the middle of the block to within 20 or 30 feet of the property line at the westerly end of the lot. In other words, the toe of the embankment of the reservoir is not parallel with the lot or with the property line. It encroaches on the portion of the lot which the City has excluded 70 or 80 feet near the westerly end of the reservoir lot. That is, the embankment itself and the spur of the hill into which the embankment is built runs into that 100-foot strip. If you take the spur away, and cut down the embankment, there would be a cut I should say of about 15 feet at Larkin Street, at a point about 100 feet south of the property line of that reservoir lot.

11,022

Another question came up in Mr. Abbey's discussion, I think, of development expense, in which he gave a tabulation of the different tabulations showing the investment of the stock and bondholders, and the original cost, and his Honor was not quite clear as to the difference between the original cost and the investment cost.

11,023

The investment cost shown on page 1 of Exhibit 201 was taken from "Plaintiff's Exhibit 12 BB and CC", and represented the actual contribution by the stock and bondholders from 1858 up to December 31, 1913. The original cost of the property was 2 or 3 million dollars more than that, and there was a question as to what constituted the difference. In making a reconciliation of that, I found that the stock and bondholders had actually subscribed and paid in, as shown on "Exhibit 12-BB", \$27,526,000, and in addition to that there probably was an amount which went into the work that came out of the excess receipts over the disbursements up to June 1, 1865, at the consolidation of the two companies, the amount of which I was not able to determine. I assumed it to be the cash on hand that was shown in the trial balance dated June 1, 1865, as shown in Mr. Wenzelberger's exhibit, amounting to about \$70,000. The excess of the receipts over the disbursements from 1865 to 1913, which might be called undivided profits, amounted to \$2,172,000, so that after the investment of the stock and bondholders of \$27,526,000, I have added \$70,000 an excess

11,024

receipts, or undivided profits, and \$2,172,000 as undivided profits from 1865 to 1913, making the total actual payments, plus the undivided profits \$29,768,000.

In the accounting of the disbursements and of the charges into construction there were charged items which had not actually been paid out December 31, 1913, as represented by the current liabilities of the Company, of \$942,000. That \$942,000 I have reduced by accounts receivable which were included in the receipts, but the money was not actually received, of \$43,000. I have also deducted the sum of \$77,000 for consumers' accounts included in the receipts, but not actually received as money, and I have also excluded the stock and materials on hand, \$337,000, making a total exclusion from the current liabilities of \$457,000, leaving outstanding \$485,000, which I have added to the \$29,768,000, making a total of \$30,253,000. I have deducted from that total \$30,253,000 cash on hand and in bank as of December 31, 1913, \$130,000, leaving unaccounted expenditures which went into the original cost of the property of \$30,123,000. The original cost, as I have determined it, and as it has been put in the Exhibit 170, Table A, showed that as of December 31, 1913, the original cost of the property, excluding overhead and interest charges, was \$29,841,000, so there is a difference there of \$282,000. That is, the unaccounted cash expenditures which presumably went into the construction account are \$282,000 higher than the original construction cost as I found it from the books.

11,025

I have included the exclusions for overhead from the original cost in the expenditures for operating expense; in other words, from 1865 to 1913 the Company actually received from the sale of water and other sources \$77,319,000, and it actually spent on operating expenses, taxes, interest on bonds and floating debts, and dividends, including in the operating expense engineering and other overhead items which I took out of the original cost, a total of \$75,147,000. I did not include in that \$75,147,000 the depreciation allowance of \$260,000 for 7 years from 1908 to 1913. That \$1,560,000 in the figure \$2,172,000 is undivided profits, and as that money went back into the construction of the property again, it would account in the \$30,123,000 which I have given.

In going over this I found that the Exhibit 170, Table A, showing the original cost as of December 31, 1913, \$29,841,000, is an error to the extent that in the original cost of the property in 1913 I have deducted from the total original cost the equipment cost for the Millbrae Pumps, and a few other items, which I should not have done, because, in Exhibit 171 I also made a deduction. I have taken out that amount twice, and the original cost should be actually \$140,000 more than I show on Table A, Exhibit 170; that makes the difference really instead of \$282,000 only about \$140,000.

Mr. Metcalf: When Mr. Sharon got the reconciliation down to that point, I told him I thought it was unnecessary to attempt to go further with it, particularly as your Honor would appreciate the involved character of an investigation of this sort, but it seemed to show that the two estimates are in line with one another, and the chief difference comes in the re-invested undivided profits. 11,026

Mr. Sharon: You asked me to look up some information in connection with the Pilarcitos Tunnel in this exhibit of Mr. Higgins' testimony in the 1903-04 case. This relates to Exhibit 211. The question came up with reference to Mr. Higgins' testimony in that case as to the number of bricks that a bricklayer could lay per day. He said, as shown in Exhibit 211, on page 6, that he was given the contract to brick the Pilarcitos Tunnel No. 1 with provision that he would have to finish that work in 42 days, as that was the capacity for storage at Lake Honda at that time to hold over 42 days' supply, and upon the basis that he finish it within 42 days he figured out that the masons average about 1500 bricks a day, working a 10-hour day. I found, from the water journals of the Company for the year 1871 that the superintendent has noted here, under date of March 14, 1871, that "Water was shut off from Pilarcitos this morning to commence to brick Tunnel No. 1." I found no record in between that and May 21 that there was any intermission of the work, and that the work was actually finished, as per this statement: "Finished bricking Tunnel No. 1; see page 73 for commencement." The difference in time between March 14 and May 21 is 67 days instead of 42 days, and assuming that Mr. Higgins did not work on Sunday, there were nine Sundays, that would make 58 working days in which he had to do the work, instead of 42, so that the average number of brick laid per bricklayer a day would have been reduced from 1500 to about 1100 brick a day. 11,027

Questioned by Mr. Searls. 11,028

He said "I employed in that work 4 masons and 11 laborers, and with that force I finished the bricking of the tunnel in about 42 days. The masons averaged about 1500 brick a day, working 10-hour shifts." That is on page 7.

Questioned by Mr. Greene.

On page 6, near the middle of the page, he said: "Mr. Higgins, we have thought your bid over, and have come to the conclusion to give you \$24 per thousand for laying those brick, labor only, you furnishing all the necessary tools. We will take the pipe out that is in there, and put a track in there for you." Then Mr. Higgins replied: "Mr. Abbey, if I can lay those bricks for \$25 a thousand, I can surely lay them for \$24; I will do it for \$24 per thousand." Mr. Abbey said: "There is one provision that I want to put in that contract." Mr. Higgins said: "What is that?" Abbey said: "Mr. Higgins, Lake Honda holds 42 days' supply of water, and we

"let you this contract on condition that when you are at work, and
 "our water runs out, as the only supply for that reservoir is through
 "this tunnel, that you will stop working and allow us to run suffi-
 "cient through that tunnel to supply part of the city without any
 "extra expense to the company."

There might have been an interruption during which the Com-
 pany was running the water through, but this record, which is very
 full, does not show any record of it, and I assume if there was any-
 thing like that done, there would have been a record made of it.

Muhlner Witness: F. P. MUHLNER for Plaintiff.

DIRECT EXAMINATION BY MR. GREENE.

A request was made that a segregation of the expenditures in-
 curred for the report made to the Secretary of the Interior be made
 to show, if possible, the amounts of this cost that could be directly
 charged to the work for the Secretary of the Interior and the Army
 Board of Engineers, and the amount that was purely for Company
 records.

(Expenditures for report made to the Secretary of the Interior,
 and Advisory Board of Army Engineers, 1912, introduced and
 marked "Plaintiff's Exhibit 218".)

In this exhibit the detail of the items making up the total as
 shown in Mr. Bailhache's exhibit, as reviewed in my exhibit No.
 176, is shown in three columns, the first column showing of those ex-
 penditures those valuable for protecting the position of the Com-
 pany in litigation, in changes of operating methods, in studies and
 designs for operating and for future development; the second
 column is the segregation for the report to the Secretary of the In-
 terior, and Army Board, regarding the investigation of the San
 Francisco water supply. The third column is the total. The total is
 \$44,179.07.

A note is shown on the bottom of page 3 as to certain expendi-
 tures covered by the asterisk shown on pages 2 and 1, reading
 "These expenditures covered independent investigations, reports
 "and records upon the water yield of the properties of the Spring
 "Valley Water Co., and are valuable as permanent records for the
 "Company, and were also requisite for filing with the Secretary of
 "the Interior in the hearing of 1912. 50% thereof, namely, \$6,879"
 —that figure is 50% of the totals of items \$7,428.07 on page 1, and
 \$6,510 on page 2—"is segregated as essential for the Company's
 "records, and the remaining 50% as essential for the hearing before
 "the Secretary of the Interior."

On page 4 is a notation to the references in Plaintiff's Exhibit
 176, showing the page and the items making up the totals of column

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1, \$19,150.54, column 2, \$25,028.53, and column 3 the total, \$44,179.07. Another item that apparently was not finished was the item on page 9,318 of the record regarding a break in the Alameda pipe line near the Homestead. An explanation of that item is this, that the Alameda pipe lines passes through a district in San Mateo County known as Homestead, which is near the marsh lands, and the soil contains deposits that tend to deteriorate the pipe line. In May, 1914, a break occurred, and in order to properly repair the break it was necessary to replace about 60 feet of pipe. The total cost of this work was \$809.96. Although there were elements of depreciation in this work, the fact that the length of pipe replaced was short, and that the Railroad Commission's classifications of accounts provided that in the replacing of short lengths of pipe the cost of that work may be charged to operating expense, the Company so charged it, and it appears in the Company's records in that account.

11,031

Questioned by Mr. Searls.

The Railroad Commission report applies to supply mains as well as transmission mains.

Questioned by Mr. Greene.

That is essentially a repair item, but as I say, there are elements of a depreciation in it, but the item is purely an operating and maintenance charge.

The next item is on page 9,321 of the record, referring to irrigating pipe for agricultural land, the size of the pipe being 11 inches. This is in reference to Exhibit 176, page 9, item 14. This pipe was bought for irrigating the company's property near Pleasanton, and the whole amount, \$705.76 represented the value of the pipe, and this was conceded as a charge against betterments in the exhibit, I think it was 201, filed by Mr. Metcalf.

11,032

On page 10,224 of the record a request was made for a notation as to the bonds sold by the Spring Valley Water Co. subsequent to 1903. This list was included in Exhibit 124, page 1. It contains the sales of the 4% general mortgage gold bonds, the exchanges of the 4% gold bonds, and the sales of the 5½% collateral trust notes of December 1, 1913, and also the sale of the 5% collateral trust notes of September 1, 1915.

The following are the General Mortgage 4% Gold Bonds issued by the Spring Valley Water Company:

11,033

SALES.

Dec. 7, 1903	\$ 500,000 at 95
Jan. 23, 1904	500,000 " 95
Nov. 19, 1904	500,000 " 95
Feb. 28, 1905	500,000 " 95
May 1, 1905	1,000,000 " 95
Sep. 12, 1906	884,000 " 93

Total Sales \$3,884,000

Forward—Total Sales \$ 3,884,000

Refunds and Exchanges of Spring Valley Water Works, first, second and third Mortgage Bonds, for Spring Valley Water Co. 4% General Mortgage Bonds:

Dec. 31, 1903	\$ 330,000 at par
Jan. 21, 1904	15,000 "
Feb. 10, 1904	2,000 "
June 23, 1904	12,000 "
Sep. 12, 1906	13,616,000 at 93

Total Refunds and Exchanges 13,975,000

Total \$17,859,000

Dec. 1, 1913—2 Year 5½% Collateral Trust Gold Notes, issued at 98 \$1,000,000

This issue was refunded by the issue of 5% Collateral Trust Gold Notes of Sep. 1, 1915, at 98, which are now outstanding \$ 2,500,000

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I have prepared a tabulation similar to the one filed in Exhibit 124, entitled "Revised summary of revenue and expenditures of the Spring Valley Water Co. during the period 1907-15, determined by deducting from Plaintiff's Exhibit 124", the eliminations conceded by the company, and making corrections on certain classes of items, legal, water rate suit, and automobile expenses, as agreed to with Messrs. Searls and Ellis. This statement shows in columns for the fiscal years covering the various suits, first, all the revenue of water sales, including the 15% under injunction. It is just the same table that I had in the other exhibit, with this exception: There are two main changes in this table. The changes occur in the operating expenses in which the original figures, as submitted by the company in their Exhibit 124, have been reduced by the amount of the concessions, as shown by Mr. Metcalf's exhibit, and also a copy of which follows in this exhibit. Also, the adjustment of the legal fees, in legal expense, water rate suit expense, and also the pro-rata of the automobile expense account. In addition there is shown in the fiscal year 1907-08 the agreed amount of the excess collected over and above the ordinance rate, \$250,000. This figure is shown in this column in order that the net revenue of the company may be comparable with the other fiscal years. There is also shown in the operating expense on this same table a segregation of the operating expenses generally, and the expenditures incurred in connection with the water rate suit as a separate item. These are included in the total operating expenses, but the items are kept separate.

11,034

11,035

The next page, Schedule B, adjustment and corrections of the operating expenses of the Spring Valley Water Co., shows on the first line the total operating expenses, as per books of the company, "Plaintiff's Exhibit 124", pages 5 and 14, and gives there the operating expenses as first reported, and filed by the company in this suit. Next the deductions conceded by the Spring Valley Water Co., Schedule C, follows on the next page, which agrees with the figures filed by Mr. Metcalf. The next represents net additions and deductions necessary to and from operating expenses as a result of the agreement between Mr. Searls and Mr. Greene over the amount of the fees of McCutchen, Olney & Willard during the seven fiscal years in question.

The next is the addition to operating expenses of legal fees of McCutchen, Olney & Willard on account of the hearing before the Secretary of the Interior. The next are the legal fees of McCutchen, Olney & Willard regarding Lobos Creek matters. The next is water rate suits. This represents the adjustment of the legal fees of McCutchen, Olney & Willard. The automobile account represents the net deductions and additions due to the pro-rating of the automobile expense account as agreed. The last line represents the net present operating expenses of the company, and these totals are carried forward to page A, which are the present deductions from revenue.

ONE HUNDRED AND FIFTY-FIRST HEARING.

MAY 4, 1916.

Witnesses: GEORGE TOURNY for Plaintiff.
G. A. ELLIOTT for Plaintiff.
F. P. MUHLNER for Plaintiff.
J. J. SHARON for Plaintiff.
LEONARD METCALF for Plaintiff.
WM. MULHOLLAND for Plaintiff.
W. B. LAWRENCE for Plaintiff.
N. RANDALL ELLIS for Defendants.

11,036 ("Average draught of the Pleasanton Wells, Sunol Galleries, and
Alameda systems" introduced and marked "Plaintiff's Exhibit 219".)

11,037 (In regard to the testimony of Mr. Dillman on going concern in
11,038 the Haywards case before the State Railroad Commission: The
Master stated, as he saw it, the facts seemed to be these; that there
was a so-called Exhibit D which included a valuation of the elements
of going concern, which appears to have been stated by Mr. Dillman
to be his valuation, and that now he explains that by saying that he
did not believe in such a valuation, and that Mr. Sutro, the attorney,
included it as a legal proposition, and the actual adoption of the mat-
ter by Mr. Dillman will be possibly an impeachment, something which,
perhaps, assuming the facts to be as stated, he should not with entire
care have done. There is no question of integrity involved, because it is
a statement of opinion as to a very much mooted question; if it were a
question of fact, and a witness said one thing here in court, and another
11,039 thing at another time, of course, his impeachment would be complete,
unless there was some explanation worthy of credit, but when it
comes to a question of opinion, especially on a matter of going con-
cern value, every engineer whose mind is alive would reserve the priv-
ilege of changing his opinion as years went by, and without casting
any discredit upon the engineer, he might have entirely contrary views
on that subject. Counsel for both Plaintiff and Defendants were satis-
fied to let the matter drop there.)

Tourny Witness: GEO. TOURNY for Plaintiff.

DIRECT EXAMINATION BY MR. MCCUTCHEN.

(A statement showing a number of loans made by the German Savings & Loan Society, with average rate of interest, introduced and marked "Plaintiff's Exhibit 220".)

11,040 City of San Francisco, and outside of San Francisco. In 1907
we made 306 loans at 5%, and 376 at 5½%, in the City of San Fran-
cisco; 70 loans at 5½% to 6½%, and over, outside of San Francisco.

SPRING VALLEY WATER CO. VS. CITY AND COUNTY OF SAN FRANCISCO

In 1908 we made 673 loans, at $5\frac{1}{2}\%$ in San Francisco, and 36 at 6 to $6\frac{1}{2}\%$ and over, outside of San Francisco. In 1909 we made 1,216 loans at $5\frac{1}{2}\%$, and 51 at 6% , in San Francisco, and 101 loans at 6 to $6\frac{1}{2}\%$ and over, outside of San Francisco. In 1910 we made 1,207 loans at $5\frac{1}{2}\%$, and 45 loans at 6% , in San Francisco; outside of San Francisco 71 loans at 6 to $6\frac{1}{2}\%$ and over. In 1911 we made 1,042 loans at $5\frac{1}{2}\%$, 47 at 6% , and 12 at $6\frac{1}{2}\%$, in San Francisco, and 72 loans at 6 to 7% outside of San Francisco. In 1912 we made 1,403 loans at $5\frac{1}{2}\%$ in San Francisco, and 131 at 6% in San Francisco, and 98 loans at 6 to 7% outside of San Francisco. In 1913 we made 780 loans at 6% in San Francisco, and 55 loans at $6\frac{1}{2}$ to 7% outside of San Francisco; in 1914 we made 1,741 loans at 6% , and 16 at $6\frac{1}{2}\%$ in San Francisco, and 51 loans at 7% outside of San Francisco.

I believe the rates stated are substantially similar with the rates of other banks conducting business similar to ours during that period.

On page 2 appears a table showing deposits in the German Savings & Loan Society, with dividends paid to depositors from January 1, 1907, to January 1, 1915. The dividends to depositors for the half year ending December 31, 1906, the rate was 3.60% per annum. For the half year ending December 31, 1907, it was 3.80% per annum; from that time on the dividends to depositors has been 4% right along. The dividend on January 1, 1908, was at the rate of 3.8% , and it is payable on January 1; it is declared for the half year ending December 31, 1907, and the same is true of all the rest of them.

11,041

Questioned by Master.

The July 1st interest rates were the same. For instance, the rate on July 1, 1907, was 3.60% , and then during 1908 it was 3.80% for two dividends, and ever since it has been 4% .

Questioned by Mr. Greene.

These rates were the same as the dividend rates of other banks during that period, as far as I know. That is the nominal savings bank dividend.

The following eight of the exhibit pages contain a number of mortgage loans made by the German Savings & Loan Society, covering principally property in the City and County of San Francisco during the years 1907 to 1914, and they show the name of the borrower, the amount of the loan, and the rate of the interest. These are not all of our mortgages. The principle I have adopted in the selection was because of their being the larger amounts. They are all \$10,000 and over. They do not include any of the title expenses; that is, expense of title investigation, or attorneys' fees, or recording fees.

11,042

CROSS EXAMINATION BY MR. SEARLS.

The highest one of these loans is \$375,000. This list is up to 1914. If I were to show them for 1915 I could show you two loans that we have made within the last three months at 6% , one of \$600,000 and

11,043

some odd, and the other of \$523,000; those are about the largest loans that we have on our books.

11,044 A man who wants to borrow a million dollars or more, could not borrow it from any savings bank, on account of the limitation under the Bank Act. There are only two or three banks that could make a single loan of a million dollars, on account of the capitalization. The restriction is a certain percent of the capital. Life insurance companies are about the only ones that make the very large loans. Some of these large loans are made, for instance, through the life insurance companies, and there are loans that are made by life insurance companies by which the borrower has to take out a certain life insurance in connection with a loan, and thereby obtain a little lower rate than the going market rate.

11,045 I know people have come to the bank, and have said, "I can get "this loan from such and such a life insurance company", and I said, "Well, all right, what are the terms?" "Well, I have got to take out "a \$100,000 life insurance policy." That has happened to me, and I have seen loans go, but I do not wish to speak of any particular instance, because I have no personal knowledge.

Questioned by Master.

My statement just made is a statement derived from my personal experience, in the nature of hearsay, without specific knowledge in specific cases. For instance, in the case cited, of a loan in 1911, by the New York Life Insurance Co., to H. P. Law, for \$1,000,000, at 5%, 10 years, on the Monadnock Building, I do not know as a fact whether Mr. Law was required to, or did take out life insurance.

Elliott

Witness: G. A. ELLIOTT for Plaintiff.

DIRECT EXAMINATION BY MR. GREENE.

11,046

The inventory of all the properties in San Francisco was made jointly by Mr. Stocker for the City of San Francisco, and myself for the Spring Valley Water Co., and in no case did we include in the inventory any allowance for waste of any kind whatever. All of the quantities in there were unit quantities as actually measured in the structures. At the beginning Mr. Ransom was in charge of the city's end of the inventory, but it was soon shifted to Mr. Stocker. Mr. Stocker, Mr. Ransom, and I met on occasions on some of the structures we took up at first, but most of it was between Mr. Stocker and myself.

Questioned by Master.

Mr. Lawrence for the company, and Mr. Noble for the city handled the inventory on outside properties, I believe. I think Mr. Noble worked under Mr. Dockweiler's direction. He was Mr. Dockweiler's assistant, and undoubtedly Mr. Dockweiler worked in conjunction with him.

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Mr. Metcalf: Mr. Dockweiler's discussion upon this matter appears in the transcript at pages 5,370 and 6,100. 11,047

Witness: F. P. MUHLNER for Plaintiff.

Muhlner

DIRECT EXAMINATION BY MR. GREENE.

(Spring Valley Water Co. revenue and expenditures revised, introduced and marked "Plaintiff's Exhibit 221".)

Page C is a memorandum of items conceded by the Spring Valley Water Co. to be deducted from operating expenses, and to be charged to new construction, or eliminated, etc. There follows a list of these items, separated into the fiscal years in which they were charged, and here is shown below the total amount for each fiscal year which the company concedes and eliminates from its operating expenses. These figures refer to Schedule B on the second item. I have not, in this schedule, made any segregation to show to which account, as between absolute elimination and construction, these various items have been attributed. Schedule D is a memorandum of detailed adjustments and corrections of legal expenses, water rate suit expense, bookkeeping records of the 15% account, and automobile accounts in operating expenses, as agreed to between the city and Spring Valley Water Co. 11,048

Questioned by Mr. Searls.

I do not mean to say that you agreed to the total of the expense items, but to the total of the fees of McCutchen, Olney and Willard in the legal expense account, and in the water rate suit account. I mean the amounts as charged.

Mr. Searls: We agree with Mr. Greene's statement as to what the legal bills were, and as to what the segregation was.

Questioned by Mr. Searls.

Mr. Muhlner: There is this difference between this table and the table I furnished you before: The left hand portion, or the "A" portion of the statement shows what has been actually charged on the books of the company for the fees presented of McCutchen, Olney & Willard for the fiscal years in question, and under the B section is the amount agreed to by you and Mr. Greene as to the proper charging of the total bills, that is, the segregation of the total of McCutchen, Olney & Willard. 11,049

DIRECT EXAMINATION BY MR. GREENE.

The reason I have under the "A" segregation, \$160,000, as against \$150,000 under my "B" section, is this; that in order to complete the accounts properly for each calendar year, it was necessary to bring in an estimated amount of legal fees of McCutchen, Olney & Willard on the books. We did not get that bill until sometime subsequent to the closing of the books for the calendar year, and as a result, the bills

11,050

are not always in accord with the amounts that we estimate, and as a result, covering the seven years we have overestimated the fees of McCutchen, Olney & Willard to the extent of \$9,000. The figures under "A" section appear in my Exhibit 124, and the figures under "B" appear in the agreement between Mr. Searls and Mr. Greene. The reference to that agreement is page 9,246 of the record.

Questioned by Mr. Searls.

In making my final figures, I have deducted from my original total operating expenses the amounts under Schedule A; in other words, the amounts that were originally charged, and taken them entirely out of the books from the total operating expenses, and then have added to the operating expenses the amounts under Schedule B; in other words, "A" is entirely eliminated from the total operating expenses, and "B" is substituted. That appears in sheet A, in item 11. Schedule B shows the net result of that adjustment, and schedule D shows how that net was arrived at.

11,051

If you will notice under the classification "B", the third column is entitled "Amount of bills chargeable to water rate suits"; now, I have done the same thing in the water rate suit expense accounts as I did in legal expense, eliminating entirely the amount of the fees estimated of McCutchen, Olney & Willard, and substituted this segregation of the fees, as agreed to by Mr. Searls and Mr. Greene.

Mr. Metcalf: You will remember, Mr. Searls, Mr. Muhlner treated that in a different way from that in which I treated it. I made a deduction without admitting the propriety of it of the legal charges on the rate suits; he included it in the operating expense.

Mr. Muhlner: The same thing is true in column 2, under "A"; \$96,000 represents the total amount as charged on the books of the company to general legal expense, and under column "B", \$78,000 is the agreed fees of McCutchen, Olney & Willard, which will substitute the figures under column 2 under classification "A".

11,052

You have not allowed in Exhibit 208 all of these bills as chargeable to general legal expense; that is where the big mix-up comes in the understanding of the agreement in the record. Mr. Bailhache did not entirely do that. If you remember, Mr. Searls, you took exceptions to certain charges that were made in the operating expenses under general legal expenses which aggregated something like \$97,000 or \$98,000, and Mr. Bailhache has substituted figures aggregating something like \$150,000, or the total amount of the agreed fees.

Mr. Bailhache took exception to something like \$97,000 of legal fees of McCutchen, Olney & Willard; in this amended statement of fees, which Mr. Greene and Mr. Searls agreed to, he substituted this \$150,000 in place of the \$97,000; in other words, he took out all that you had agreed upon, irrespective of the account to which it was chargeable. In substance that means this, that Mr. Bailhache took ex-

ception in the first place to all the charges of the water rate suit expenses which contained fees of McCutchen, Olney & Willard. Then in turn he takes exception to \$44,500, the amount of the segregated bills which you agreed to; in other words, he deducted twice.

In the first exhibit which I filed I included in my water rate suit expenses a proportion of McCutchen, Olney & Willard's bill, and I had to take this out subsequently in making my adjustment of the expenses.

11,053

Mr. Bailhache: I would like to explain in regard to that that the stipulation entered into at the time, on page 9,346, concerned only the charges for legal expenses, and did not concern the charges for water rate suits. If you will consult page 9,346 of the record, you will see Mr. Greene said, "We will erase this line and substitute this for it." The original amount charged for legal fees by the Spring Valley is \$62,500, and \$537.20, and now they want to cut it down to \$44,000 for the whole thing, including the legal expense and the water rate suit expense.

11,054

Mr. Muhlner: No, that is not quite correct.

Mr. Greene: We have not eliminated from our operating expenses attorneys fees in connection with water rate suits. We have put them in a separate account so that they can be treated by themselves as they stand on a distinct basis. Mr. Metcalf, particularly, did that, in that he took a separate account, and I think, reckoned his return on the rating base on the supposition that they were eliminated as a doubtful item.

The Master: Of course, water rate suit expense is not altogether composed of attorney's fees.

Mr. Greene: No, but there is no dispute so far as the other parts of the expense are concerned.

Mr. Muhlner: That is correct.

The Master: I get the point. The only reason for this segregation was due to the fact that your fees were partly for water rate suit expense, and partly for other legal expense.

11,055

Mr. Greene: Yes.

Mr. Metcalf: In my treatment I did consider all of the water rate suit expense, and not simply the legal fees, and eliminated all of them tentatively. I did not commit the company in the matter; I merely discussed it on the assumption that his Honor might eliminate them.

DIRECT EXAMINATION BY MR. GREENE.

Mr. Muhlner: In Schedule D the same thing is true again of the water rate suit expense, as was true of my explanation of the legal expense.

Bookkeeping Department: These are the amounts agreed to on page 9,192 of the record as to the proper segregation of the bookkeeping department expense on keeping the record of the 15% excess account.

11,056

The next item is automobile expense, and the first line in that shows the amounts as charged on the books of the company as taken exception to in Mr. Bailhache's original exhibit. It was agreed on page 9,236 of the record that the total of this expense, which amounted to something like \$19,000, would be pro-rated equally over the eight years of the suit, and the resulting figures show what amounts have been necessary to add to operating expense, and deduct from operating expense, under the respective fiscal years as a result of the pro-rating of the total expense of the automobile account.

Schedule E shows the memorandum of the water rate suit expenses as finally corrected for the amount of the attorney's fees, and for the amount of the agreed segregation of the bookkeeping department expense on keeping the 15% records. The first line shows the total expense as originally shown in Plaintiff's Exhibit 124, page 5, the totals for the fiscal years in question; next, the net adjustment as shown on Schedule D of this statement, next the net corrected expense of the water rate suit matters on the third line. The next line is the cost of transcribing testimony taken before the Board of Supervisors, as shown in Exhibit 176, page 10, item 25. Bookkeeping Department, 15% records, and the Supreme Court opinion of \$5,000 in 1908-09.

11,057

The total of that page shows the total of the water rate suit expenses, as shown on page "A" of this exhibit. I might state here that Mr. Bailhache, in his Exhibit 208, has amended his original figures of revenue, and they now practically agree with the company's original statement of revenue for the fiscal years 1907-08 to 1914, with the exception of about \$112. The item is too small to bother with. Mr. Bailhache also accepts our figures for the amount of the 15% charge, as shown in this statement, as a deduction from gross revenue of water sales, in order to show the amount that the ordinance produced.

Questioned by Mr. Searls.

It is only the operating expenses, practically speaking—item 13—in which there is still a discrepancy as to the amount. Mr. Bailhache reaches total operating expenses prior to making his deductions, which are the same as my gross operating expenses as originally filed. You understand, of course, as to item 13, they are not the same figures that were originally filed in my exhibit.

The \$16,000 too much in 1909-10, and \$16,000 too little in 1910-11, as I explained before, was an amount which in making certain correcting entries on the books in December of that particular year, I apportioned back over the particular months when the original entries were made.

11,058

Mr. Searls asked me yesterday whether the classification of the Railroad Commission of accounts of water corporations applied to distributing system or supply mains. Item E-16, on page 38 of their

classification reads, "Repairs to collecting aqueduct, intakes and supply mains". Further down it reads, "This includes the periodical seraping to remove organic growth", etc.; also "Seeking and repairing leaks, repairing pipes, and removing and replacing worn sections and fittings". There is \$809 involved, I believe, in that one item that I spoke of yesterday of the repairs to the Alameda pipe line at Homestead.

Questioned by Mr. Searls.

11,059

Mr. Bailhache took exception to certain operating expenses, and in the review of those expenses in my Exhibit 176, I made certain explanations of those expense deductions, and we have conceded out of that list these items, as shown on page C of this exhibit. We do not concede any of the other items that Mr. Bailhache deducted. Of the items that we have not conceded the only cases in which I find duplicate deductions, or errors in the amounts of the items, are those of the water rate suit, and legal expense, because Mr. Bailhache has corrected, in his Exhibit No. 208, those other deductions that he had made twice.

Mr. Muhlnher: We made estimates of the amount of the legal fees that are to be charged to water rate suits under certain years, and they are charged there to operating expense, and are included in operating expenses. Now, I want to segregate those on the basis of what were actually paid, but with the segregations in the operating expenses first. The operating expense is first corrected and adjusted to make account of that difference, and then a segregation is made.

11,060

Witness: J. J. SHARON for Plaintiff.

Sharon

Mr. Sharon: I find that while the figures as shown on page 1 of Exhibit 216 are those which were agreed to by Mr. Bailhache and Mr. Wenzelberger as being the records as shown on the books of the company for the total charges to construction, and the deductions made on the books for abandoned properties, that this statement would not properly tie up with the analysis that I made of the original cost, for the reason that deductions have been made here which I made later on in the Exhibit 171 of abandoned properties. So that, if the net amount here, \$4,698,828 is added to Mr. Wenzelberger's total as of 1903, and deduction is made on the basis of the exhibit which we put in of abandoned properties, Exhibit 171, there will have been a duplication of those properties that have been written off.

11,061

I thought possibly that later on this net total might be added to Mr. Wenzelberger's total of 1903 to get the original cost of the property to date, and then the deduction would be made for the property actually in use, and in that event there would be a duplication of the deduction. I note also that in the year 1907-08 there has been no addi-

tion made here for additional cost of Baden-Merced Tract, and the San Andres pipe line, and the Lake Honda transmission line from Daly City into the flume at Lake Honda, which was charged in those years to replacement account.

Metcalf Witness: LEONARD METCALF for Plaintiff.

11,062 Mr. Metcalf: I have to call attention to an error in Plaintiff's Exhibit 202, which formed the basis for a determination of the value of the property of the Spring Valley Water Co. annually, as of December 31, 1907 to 1914, inclusive, derived from the detail valuation as of December 31, 1913. On page 2 of this exhibit is a column headed "Add correction for dismantled property not included in 1913 appraisal, which was added in making up the corrected new construction account". I find that the items contained in column 6 were also contained in column 3 of new construction, which resulted in a duplication of those figures. Therefore it has been necessary to cut out column 6, and revise new construction account, which I have done. As a matter of fact it has very little effect upon the total amount, that is, the net or depreciated cost of the structures for the years other than 1913, as expressed as a percentage of the amount for the year 1913.

11,063

This change involves a change in Plaintiff's Exhibit 201, showing Metcalf's analysis of the fair rating base. The change is really too slight to be of any significance, but I have made it. You will see that it affects the rate of return by less than one-tenth of a percent.

I have also to call your attention to a mis-statement, I believe, of fact concerning the condition of the water in the Merced Lakes during this rating period. It seems to be a fact that my statement that the later analyses show a higher organic content in the water of the lake does not seem to be borne out by the analyses which have been made of that water. How I got the idea I do not know.

11,064-65 (Mr. Metcalf offered a number of corrections in his own evidence in the record, and it was decided best to have them copied into the record instead of reading them all in.)

11,066 Witness: WILLIAM MULHOLLAND for Plaintiff.

Mulholland DIRECT EXAMINATION BY MR. MCCUTCHEN.

I am 60 years of age, and am Chief Engineer of the Public Service Board of the City of Los Angeles, having in charge the waterworks of the City of Los Angeles, and I have been in charge of it since 1886. I have had to do with the purchase of all of the reservoir sites in use by the city, either in connection with the aqueduct, or the older ones in connection with the old waterworks.

Beginning at the north end, the Haiwee is the first one occurring on the line of the aqueduct in order; that was acquired largely from the Government. There were about 3100 acres of land there that was Government land, and there were but three private holdings in the area covered by the Haiwee Reservoir site, and the purchase of those private holdings was managed by Mr. Mathews, the attorney for the Board, and myself, jointly.

The next reservoir site south of that is the Fairmount Reservoir, which covers about 450 acres, and was selected, and the arrangement for the purchase of the land inaugurated by myself individually, and completed by the right of way agent of the Aqueduct Department, but all the negotiations as far as fixing value was concerned were transacted by me.

11,067

The next is the Dry Canyon Reservoir. That was a site in a small canyon surrounded by non-arable hills, a barren sort of country. The land had been devoted to a bee ranch, and a few acres of plow land belonging to two different parties, one named Davis and the other Moffitt. I was acquainted with Moffitt, and I began negotiations for the purchase of that land. The selection of the Dry Canyon site was not an imperative one. We could have selected another site almost equally favorable, and diverted the aqueduct in another direction. There was no secrecy about the use to which the land was to be devoted in that case. It is a small reservoir, and only contains about 12,000 or 13,000 acre feet water capacity.

The next one south of that was the Fernando Reservoir site. There are two reservoir sites there, one of which has been occupied and the dam constructed, and is now in a state nearing completion, and full of water up to the point of completion. It has about 12,000 acre feet of water in it at the present time, the dam still being unfinished, or about 83 or 84 percent completed. On the upper one of the two Fernando Reservoir sites, the reservoir has not been begun, only the surveying has been done. The acquisition of these lands for those two reservoir sites was managed almost exclusively by me. The work of getting out the deeds and descriptions, and the like of that, was in the hands of Mr. Martin, a right of way agent, being handed over to him after I had begun the negotiations. The circumstances connected with the purchase of that land were these: Just to the south of the reservoir site is a great tract of land comprising about 12,000 acres that had a very high prospective value; some of it had been planted to citrus groves, and nearly all of it was adapted to that sort of cultivation. The owners of that tract were wealthy men with whom I was well acquainted, and some of them public spirited men. I told them I wanted the reservoir site, pointed out to them that the location of a reservoir there would assist them in the sale of their land, and after the reservoir was completed, the existence of the reservoir would be an attractive feature,

11,068

and an assurance to strangers buying land that there was a bountiful supply of water available for use on that land.

That seemed to be an inducement to them, because they donated, I think, 127 acres to the city, and a quite large additional tract was sold at a nominal price of \$75 an acre, I think. The upper of the two reservoir sites was largely on the property of the Geo. K. Porter Estate. That land we bought at about \$150 an acre, which was a reasonable figure considering its character. I told Mr. Boruff, the manager of the estate, that the reservoir would be an attraction to surrounding lands which they had, and he appreciated that very much at the time, since the lake has been filled up there, and is making use of the fact of the presence of the lake in the sale of the surrounding lands, so that the conditions of purchase of these lands were favorable to the city's side in getting the lands cheaply.

11,069

The inducement in the case of the Fernando Reservoir was one that was attractive to the owners of the land. There were two small reservoirs in the Franklin Canyon, the upper one of which has a capacity of 49 million gallons, and the lower one of about 325 million gallons, but the circumstance of the purchase of the lands covered by the lower and larger of the two reservoirs was very similar to the purchase of the San Fernando Reservoir site. When I came to look up the title I made a preliminary examination of the route over which the aqueduct, or its extension pipe, would follow, and I found three sites in the Cahuenga Range that were suitable for reservoir sites. One of them was this Franklin Canyon, and another a mile further west was the Benedict Canyon, and another further to the east, about 3 or 4 miles closer to the city, in what is known as the Weid Canyon. The Weid Canyon was my preference of the three, but I found that Mr. Weid had recently died intestate, and had no immediate heirs around Los Angeles. The people were all in Germany, and the estate was in such a shape that I could not acquire the reservoir site.

My next preference was the Franklin Canyon. I found the site of the lower of the two reservoirs in a very peculiar condition. It was held under an option by two men, J. A. Anderson and Tom Hastings. Anderson was a member of the Advisory Board of the Los Angeles Aqueduct, so I went to him and told him of my discovery, and that I desired the land for reservoir use, that I did not see anything improper in his fixing some value to his option over and above what I paid, and that I would recommend a reasonable profit to him in the trade. I did not want to take the property away from him when he had prospective profits coming, as I didn't think it would be fair, and I didn't think he would need to make a sacrifice, but he insisted he did not want any profit on it, and he handed over his share of the option, and we paid Mr. Hastings \$4,900 over and above the option price to him as a profit. Mr. Anderson took

11,070

no profit, abandoned his project altogether, and deeded the property to the city jointly with Hastings.

The upper reservoir site was in the possession of a German who had a homestead on it, and we paid him \$100 an acre for the site. The reservoir site itself covered but nine acres of the 162. There were 162 acres in the tract, but it was all hill land, and there was a little shanty down where we had the reservoir, and we bought that for \$100 an acre. I don't know whether he knew what the purpose of the purchase was or not. Those are the circumstances of the purchase of all the lands that are used for reservoir purposes in connection with the development of that aqueduct.

The Benedict Reservoir site is a mile west of the Franklin Canyon, and was offered to the city for nothing by owners of quite a large tract of land that lies to the south of where it was proposed to build the reservoir; the reason for their liberality being identical with that of the owners of the Mission Land Co., at Fernando. The existence of the reservoir there would enhance the value of the large tract they owned. This Benedict site is a larger and better site than Franklin Canyon, but it had the disadvantage of requiring a greater expenditure for pipe to reach the city, the distance being somewhat greater from the city, the point of use of the water.

11,071

There are, within 4 or 5 miles on either side, parallel with the aqueduct, other sites than the five I have referred to that could be used for reservoir purposes. None of them but the Haiwee are really good reservoir sites in the common engineering sense. They all required a tremendously disproportionate amount of construction work to make them available at all. They are in narrow canyons, requiring expensive and large dams to make them useful at all for the purpose. There are almost no good reservoir sites in the country south of the Coast Range Mountains, or Tehachapi Mountains, on account of the steepness of the country. The canyons are steeply incised with erosion, and are not favorable for reservoir construction. We have eleven reservoirs in connection with the old water-works system in Los Angeles, and there is only one of them, Silver Lake Reservoir, that occupies what would be regarded by engineers as a favorable reservoir site.

Almost none of these five reservoirs have any watershed behind them. In the case of the largest one having the largest watershed, in Fernando, the catchment area is somewhat of a nuisance on account of its torrential character, its closeness to the city, and the smallness of the reservoir, so that the run-off into it renders the water turbid and unfit for use when it comes in at all, which is at occasional times during the heavy storms in the winter.

11,072

CROSS EXAMINATION BY MR. SEARLS.

The Merritt, the Orr, and McCloud, are the only three private holdings that I can remember in the Haiwee site. The character of

the lands surrounding the Haiwee was desert land, and unoccupied and in possession of the Government in large part.

The Fairmount is not so much of a desert, but virtually a very arid country, and not a favorable place for farming, or any other sort of agricultural use. Stock raising is the use of the surrounding country.

11,073

We are desirous of getting some storage along the line of the aqueduct, but there is very little good storage in the South for the reasons I have stated. Those reservoirs such as we have selected and utilized are all small and undesirable on that account. That is true of the Fernando. In fact, we are seeking to amend that deficiency by the purchase of a large reservoir site, known as the Chatsworth, at the west end of the valley. There is no reason why it could not be used for either irrigation or domestic storage. It would be connected jointly with the other lines of the Franklin Canyon pipe, and I do not see how Mr. Bayley could have made the mistake of saying that it would be only available for irrigation storage, because the design of the pipe is such that it leads into both reservoirs in common, when that is built. The elevation is at 980, and the bottom of the Fernando is at 110, so the elevation is not too low. The elevation of the Summit passing through the Cahuenga Range, which would be the limit of its usefulness, is only 850 feet, so the water from the Chatsworth could be passed through even for domestic use into the city system. I don't think it will ever be required for use for that purpose, though. We have a sort of an option on the Chatsworth. The owner of the site is Mr. Sesnon, and there is a very intimate understanding between him and myself, and Mr. Mathews, our attorney, about the terms upon which we can obtain the reservoir. The proposition is for each of us to select a man, and those two to select a third, to act as arbitrators, and whatever they say, the city is to pay. That arrangement was made with the sanction of the Board of Public Service Commissioners, and Mr. Sesnon is ready and willing at any time to submit to that form of appraisal.

11,074

The Centinella Reservoir site is in the future. That is in contemplation for another and greater development of the works. It is further to the south, and its use will be confined to the storage of water for the Redondo District, which is not yet annexed to the city.

11,075

The only inducement I offered the owners of the San Fernando site was the fact that we were going to build a reservoir there which would add to the scenic character of the land, and also the fact that the water would be available for use on their lands. When I say that the water would be available for their use, I mean that the city would sell the water to them the same as it does to any other consumer, but they are all inside the city now, and that was part of

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the plan even then. They were not to get any preferential rates for the water.

We have altogether an aggregate of about 550 million gallons in local storage, not including the Fernando, lying close to the city. The Fernando Reservoir is one that cannot be depended on as a storage reservoir in connection with the domestic supply of the city, because the water will all be drawn out of it, I think, by the end of June each year. The irrigation season begins there about the first of May, and reaches its height about the end of June, and by that time the reservoir would be empty, and the water direct from the aqueduct supplied. The aqueduct delivers into the San Fernando, but the diversion will be so great in the region of the Fernando Reservoir that all of the water contained in the Fernando Reservoir will be run out in the early part of the season, notwithstanding the fact that the aqueduct's water is constantly coming in. There are some 70,000 acres available there for irrigation, and it is all land that requires a very copious application of water to make it fruitful. We would be very glad if we had a reservoir site twice or three times as large as the Fernando Reservoir site.

11,076

If we could get a number of other reservoir sites that were equally satisfactory, although not larger, that would very materially add to the complexity of the works. They would have to be spread out, and it would take an enormous amount of engineering work to combine them together to make them work harmoniously. They don't occur at advantageous elevations, and there would have to be some relation between their elevations. While there are lots of little canyons in the South in the Cahuenga Range that are equally favorable with the Franklin Reservoir, they are isolated, separate from one another; it would cost a great deal of money to connect them together to make them work harmoniously. Also, they are out of harmony as to elevation. That is, having established an elevation for one reservoir, and having built that aqueduct correspondingly, it fixes it for the others to the south of the Cahuenga Range, not necessarily to the north, as we have a great deal of arable farming land that lies quite low. There is very much south that we could irrigate with larger reservoir sites, if we had them, but they do not exist.

11,077

For instance, having established our gradient, say at San Fernando, the construction of that reservoir would make it a very difficult proposition to take any of the other canyons and build a reservoir in them, unless they were lower, with a delivery above the point of available use.

There is another thing about the Benedict Canyon donation; if my memory serves me, the offer was made after we had completed negotiations for the Franklin Reservoir.

The present residential suburban district is about 21 miles

11,078 from the San Fernando Reservoir by way of a pipe line leading to the city. The character of the land surrounding the Fernando generally is farming land. There are about 1200 or 1500 acres immediately adjoining the reservoir land that are in citrus fruits, oranges and lemons. With respect to the Franklin Canyon, the city does not extend out close to that now, but right in front of the canyon is a subdivision which is now incorporated, known as Beverly Hills. It is a suburb of Los Angeles, and we do not supply it with water. It is a city of the sixth class, and has its own government.

Referring to a map: This area north of the Santa Monica Mountains, which I have called the Cahuenga Range, is the Fernando Valley. The Fernando Reservoir has a position to the northwest corner just off the sheet. The heavy line drawn here is the pipe leading in from the Fernando Reservoir to supply the domestic water needed in the City of Los Angeles. If the Benedict site had been selected, which is at the head of Benedict Canyon, the pipe line could have been diverted to run through there, but the elevation there was rather greater than we desired to serve into the pipes of the city; that was one of the objections. The other objection was that the tunnel through the ridge of the mountains was about a quarter of a mile longer than the tunnel going through at the Franklin site. The third objection was that the distance of the pipe line from the reservoir into the city was greater than it is from the Lower Franklin into the city, so that the expense for pipe was greater. My preference would have been for the Weid Canyon. That would have required a straightening out of the pipe, a more direct line into the city, a better and a larger location, a larger site, and no tunnel to go over the Cahuenga Pass, the elevation of the pass being 795 feet, whereas, we went through elevation 850 to get to the Franklin. This Weid Canyon is the property of a German who was an old resident of Los Angeles, and who died without family, and left his estate in such a muddle that we did not have time to wait to clear it up.

11,079

The Weid Canyon site would have been about two and a half times the capacity of the Franklin site, and the city may acquire it yet. The people of Hollywood have got out a district bond for the building of a pipe line along what is known as the Calabassus, or county road from Franklin pipe line over the pass. If that pipe is laid, I will recommend the use of this canyon in connection with that pipe line. That has an elevation harmonious with that of the Franklin Reservoir; that is the 500 foot contour, and the 500 foot contour at the Franklin Reservoir is at the same level, but high water in here is 564 feet, 64 feet higher than the 500 foot contour there, and we could readily fill to that level on the Weid site.

11,080

(Map showing location of Benedict Canyon, and Weid Reservoir site, introduced and marked "Plaintiff's Exhibit 222".)

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Questioned by Mr. McCutchen.

I do not consider in any sense any of these ideal reservoir sites. It is the engineering work really that makes them. These smaller ones, like Dry Canyon, or either one of the two Franklins, as far as engineering work is concerned, a reservoir of equal capacity could be built for about the same money if it were out on an absolutely flat field.

Questioned by Mr. Searls.

It is a fact that that is practically the only storage that is available in the immediate vicinity for the City of Los Angeles, with the exception of those I have named, Franklin, the Weid, and the Benedict. There are other canyons in there, but requiring more diversion from the course of the water coming in. These lie fairly in line with the development work.

Witness: W. B. LAWRENCE for Plaintiff.

Lawrence

DIRECT EXAMINATION BY MR. GREENE.

11,081

I am familiar with the preparation of the inventory showing the physical structures of the Spring Valley Water Co., and the quantities which are incorporated in that inventory, as far as they appertain to structures outside of the City and County were ascertained by me, or under my direction, in conjunction with the representatives of the City. The quantities were net quantities.

CROSS EXAMINATION BY MR. SEARLS.

By "net quantities" I mean actual quantities that are in the structures. If we were measuring up a flume, we would take the length of it and the width of it as being the direct quantity. If we came out with an uneven number of feet, that was rounded off. I don't think we carried it down to the actual foot board measure. Mr. Noble worked on the City side with me, and Mr. Dockweiler was there a very little part of the time checking up part of it.

11,082

Witness: F. P. MUHLNER for Plaintiff.

Muhlner

DIRECT EXAMINATION BY MR. GREENE.

Perhaps it would be of interest to the Master to know from what source the Company derived its money for the new construction work done since 1906 down to June 30, 1915. The amount expended totals approximately \$4,500,000, and the money was got approximately as follows: by the sale of 126 Stockton Street, \$500,000; the balance of the assessment left over and above the amount ex-

pended on rehabilitation work, \$220,000; the transfers of equipment, etc., about \$200,000.

11,083

Questioned by Mr. Searls.

That was not a source of income. For instance, if we were to take out, as we did, a piece of equipment from Millbrae Pumping Station, and put it at Central Pumping Station, we would credit the property account with the value of the equipment taken out, and charge the new account with the value as put in, just as a bookeeping entry, but the debit is included in that \$4,500,000. This shows the source of that equipment. The 5½% collateral trust notes of December 1, 1913, that is, the proceeds of that, \$980,000; the accumulated surplus at June 30, 1915, \$496,000; the invested depreciation fund June 30, 1915, approximately \$1,700,000, and the liabilities in the form of notes and mortgages still remaining unpaid at that date \$400,000. These approximate the total of \$4,500,000.

Accumulated surplus is the result of all the Company's revenue, including the water rates, and other sources of income, such as rents, and the sales of property, less operating expenses, taxes, depreciation allowance, and dividends. That is, we have paid dividends during these years, and still have that undivided surplus, \$496,000.

Metcalf

Witness: LEONARD METCALF for Plaintiff.

11,084

(Mr. Metcalf noted certain corrections in his testimony in the record.)

11,085

In my evidence regarding the inclusion of the Pleasanton lands, at the bottom of 10,374, and the top of 10,375, appears this statement: "perhaps it cannot be definitely foretold, probably cannot be "definitely determined, even after the whole transaction is completed, but it seems to me that the course which was pursued by "the Company was not an unreasonable one, was a natural one, "and having actually paid for the land as it did, it seems to me "reasonable to include them in the rating base.

"Mr. Searls: At their full value?

"A. At their full value, Mr. Searls, certainly at their full value "for a period of perhaps two years, even though some allowance "should be made after that time on the assumption that they might "perhaps, have sold out a portion of the lands during the latter part "of the interval involved in this rate suit."

What I had in mind was that I did not mean to imply that according to my view I would limit to two years. I think that the text before shows that I did not have that in mind, but that if your Honor assumed that they should have been sold off, it seemed to me a period of at least two years should be allowed for the selling

off; it was merely an expression of opinion, but that seems to limit it, the latter part of the statement, absolutely to two years; of course, that is not in accord with the first statement.

(Certain corrections noted in the transcript.)

11,086-89

Mr. Pracy has given me the analyses of the south Merced Lake water from 1900 to 1915, inclusive, and I have had figured the average result for each of these years in question, and have summarized those in a table.

11,090

(Analyses of waters of South Merced Lake introduced and marked "Plaintiff's Exhibit 223".)

You will note in Plaintiff's Exhibit 223 that in the first column is given the dates of sampling and analysis. In the second column the total solids; in the third column the solids lost on ignition; the fourth column the fixed residue; the fifth column the chlorine; the sixth column the nitrites; the seventh column the nitrates; the eighth column the free ammonia; the ninth column the albuminoid-ammonia; and the tenth column oxygen consumed, the results all being stated in parts per 100 thousand. After giving the individual results of the analyses for each of the years stated, there is given the average of the year's record. For instance, you see for the year in the middle of the first page, year 1908, the total solids 283, the loss on ignition 94, fixed residue 189, chlorine 61, the nitrites zero, the nitrates .074, the free ammonia .032, the albuminoid-ammonia .330, and the oxygen consumed 5. Similar results are given for each of the other years.

You will see, as you glance down the column of this exhibit, that the total solids have not changed materially during this period of time. They are somewhat less at the end of the period, but there is no material change. The difference is not appreciable within the limits of accuracy of such sampling and analyses. The chlorine in which we would expect to get a substantial change if the effect of the manuring had been marked, does not seem to have changed materially during the period. At the beginning of the period it was 62, 61, 59, and at the end of the period 64, 60, 64.

11,091

Questioned by Mr. Searls.

There was no manuring done in the year 1913 in proximity to the lake, but in the year 1915 it is the same as it was in the year 1914; in other words, the difference is not marked enough for us to be sure that it was not a difference in sample. In November, 1900, the chlorine was 66, and in the same way in 1901, 1905, and 1906, it was about the same; the nitrates have not changed materially. They are irregular, and none of them indicate any substantial amount of past pollution. That is one of the signs used by chemists, if the nitrates are high, it indicates a purified past pollution. The albuminoid-ammonia, which would show the recent pollution, has not

11,092

changed materially. Beginning with .35, .33, and .26, we have in comparison for the last three years .28, .30, and .29.

In order to say that you have gotten a material difference, you would expect to have the ammonia appearing immediately after the decimal point; in other words, here it is .052, so that you have .052 of a part per 100 thousand. The actual quantity present is very low, so I have to confess that I was wrong in my statement with regard to what the analyses showed. I am a little surprised at it, because I should have expected to see some increase in the organic matter as a result of the manuring of these lands, but the analyses don't show it; the purification seems to be sufficient in the sand through which it passes to remove its effect.

Questioned by Master.

I should say that it is a safe water, fairly good. You would look for a determination of that in the albuminoid-ammonia and the nitrates. The nitrates do not reflect it, but the albuminoid-ammonia does. We admit that the water is not as good as from the other sources of supply, although it is a fairly good potable water.

11,093

PARTS PER 100,000.

Date	Total Solids	Ignition	Fixed Residue	Chlorine	Nitrites	Nitrates	Free Ammonia	Albuminoid Ammonia	Oxygen Consumed
1907.....	290	100	189	62	0.002	0.177	0.048	0.35	8
1908.....	283	94	189	61	0.000	0.074	0.032	0.330	5
1909.....	265	70	195	59	0.000	0.068	0.032	0.265	5
1910.....	263	79	184	58	0.000	0.015	0.0192	0.296	4
1911.....	250	65	185	52	0.0015	0.2	0.029	0.251	3
1912.....	282	69	213	62	0.001	0.145	0.020	0.263	3
1913.....	278	73	205	64	0.001	0.146	0.021	0.289	4
1914.....	262	69	194	60	0.000	0.290	0.019	0.301	4
1915.....	271	52	220	64	0.000	0.12	0.0528	0.2900	4

Ellis

Witness: N. RANDALL ELLIS for Defendants.

DIRECT EXAMINATION BY MR. SEARLS.

11,094

Referring to Parcel 18, Exhibit 91, valued by Mr. Paschel, and in connection with which he used certain information I gave as to the cost of filling in that parcel: The quantities were estimated simply from planimeter measurements, from a contour map. Mr. Paschel indicated the tract, and how he wanted it filled, and it was information he required in a hurry, and we had no time to send a field party out to cross-section it, so we took a 5-foot contour map, and simply had planimeter measurements run from the contours.

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I ignored the 5-foot contour, and took the first measurement at the 10-foot contour, which indicated an area of approximately 6.8 acres; at a 15-foot contour of approximately 25.4 acres, and at a 20-foot contour of approximately 39 acres; the 20-foot contour being at the intersection of the Sloat Boulevard. The computation on filling that gave approximately 195,000 yards, which I estimated at a minimum price of 25 cents per cu. yard. He wanted some minimum figure in that case, and I figured as if it were filled from the 10-foot contour to the 20-foot contour, and that indicated a cost of \$49,000. I just took that as a round figure in giving him the estimate.

I have some comments to make on the Calaveras Dam study made by Mr. Metcalf. Using the same figures which Mr. Metcalf had, I made certain studies to determine my estimate of the auxiliary costs, as my experience on the Los Angeles Aqueduct indicated. These figures all refer to Mr. Metcalf's Exhibit 194. What I did was this: I took his basic figures, or what was called direct construction costs, which are a segregation, I believe, that Mr. Metcalf made from the total cost in Mr. Elliott's report to Mr. Bourn. He had segregated out \$549,670, which he had called direct construction costs, and the balance he had thrown into the item of auxiliary expenses. In going over the items of auxiliary expense he had taken out an item of hydraulic pipe and appurtenances, and classified it in auxiliary expense. I deducted that from auxiliary expense, and added it to the direct construction cost. Mr. Metcalf and I had some discussion on the point. Mr. Elliott, in his report to Mr. Bourn, had classified all of his equipment together; he had classified his shovel work together; then when he came to sluicing operations he classified his labor and his pipe, both installation and renewals of his pipe and pumping parts, all in the sluicing operation; of that sluicing operation Mr. Metcalf selected certain figures bearing particular on pipe, and pumps and pump parts, and carried them into auxiliary expense, believing that Mr. Lippincott would so have carried them in his classification of auxiliary expense.

11,095

I took them out on the general theory that on the Los Angeles Aqueduct—I presume that Mr. Lippincott, since he has used Los Angeles costs, and so on, would probably follow the same procedure on the classification of such expense as they did on the Aqueduct. On the Aqueduct all renewals of equipment of any character were not carried into the auxiliary expense; they were charged directly on the work. I verified that by reference to Mr. Clemens' report, and by a discussion with the Chief Clerk who handled the Jawbone Division, and further by consultation of the official reports of the Los Angeles Aqueduct, showing in detail just how that situation was handled.

11,096

Sluicing pipe of this character is not like a conduit that is put in permanently to bring water to a point. It is a pipe line that is

carrying rocky material, and is constantly being worn out and replaced, and replacements of that character I consider exactly in the same category as replacing the car wheels on tunnel cars, or replacing shovel teeth on steam shovels. The pipe line itself, which is being constantly worn out and replaced, is a part of the construction account, the same as powder is in removing earth. On that theory I took out \$92,000.

The next operation was the estimate of Mr. Elliott to complete, from which Mr. Metcalf deducted certain items from his total charges, and classified them as auxiliary expense. He had again carried in an estimated amount of \$100,000 for pipe necessary during the completion period, which, under the same line of reasoning I excluded and carried into direct charges. In the matter of tools and supplies he had thrown all tools and supplies into auxiliary account. All supplies under the Aqueduct accounting are considered as direct costs.

11,097 On the item of \$30,000 of casualty insurance, Mr. Metcalf had included it in the auxiliary account. I took that out and classified it as overhead, in accordance with the same way that Mr. Metcalf had classified a similar item in his study of the first period, casualty insurance being usually treated as overhead.

Mr. Elliott was apparently making an estimate as to the amount of money that would be necessary to finish this job, and after piling up all the things that he could, he did as any other engineer would do, added a flat amount to cover contingencies of whatever character. Mr. Metcalf first carried it on to auxiliary costs, but I believe that Mr. Metcalf is willing to concede that taking an estimate of that character, it is, of course, not necessarily an auxiliary expense; it is put in by an engineer to cover changes in wage schedules, changes in contracts. The greater part of it might be direct expenses—consequently, not knowing exactly what Mr. Elliott had in mind under contingencies, I presume that his item of contingencies would follow in the same ratio as the ratio between direct and auxiliary charges in the estimate, as I have estimated them, so I divided them along the same lines.

For the fourth period, which was Mr. Hazen's excess completion estimate over Mr. Elliott's, that was subdivided in the same ratio as was determined from such auxiliary charges as I had determined before, and adding those together gave a total of \$2,027,000 as direct, \$327,061 as auxiliary, or a ratio of auxiliary to direct of 16.2%.

11,098 In that connection—referring to Exhibit 194—on the summary item of the auxiliary costs, Mr. Metcalf has indicated 51.1% as being the auxiliary costs to date. That is a figure that, of course, means nothing; any percentage of auxiliary costs in the preliminary stages of a piece of construction indicates nothing whatever, because

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there is no direct cost, it is all auxiliary, so I think it is agreeable to Mr. Metcalf that that percentage throws no light on auxiliary costs. The remark applies to the item 4, where it shows the overhead as 21.9%, the overhead including all the preliminary engineering, and so on, and naturally very much higher in the early stages of the work than it will be at the end. In the general discussion of the item of casualty insurance, which I do not think Mr. Lippincott dealt with at all, there was no casualty insurance at the Los Angeles Aqueduct, my contention is that had they had it, in the ordinary procedure, casualty insurance can, in no sense of the word, be considered as any auxiliary cost. Casualty insurance is practically a direct labor cost; in other words, if you are paying your common labor \$2.50 a day, and it costs you 10 cents a day to insure them on the basis of your payroll, you are paying \$2.60 for your men. It is sometimes handled either as directly a part of the labor, or as a percentage of a general overhead, but it is in no sense an auxiliary cost. There is one general criticism then on the whole, that I hardly think that anything very definite can be determined that throws light on the relation of auxiliary costs to these so-called direct costs, where possibly only one period of construction is completed; in the second place, the items which are taken as auxiliary are selected from an engineer's estimate, who, in making the estimate, did not make it with any conception of any such segregation of accounts. In other words, taking this question of contingencies as one item in point, if Mr. Elliott, in making his estimate, had in mind this artificial classification of auxiliary and direct, he might have figured all of his items somewhat differently, but I hardly think that you can take an expenditure on a piece of work in its preliminary stages, and then add to it varying estimates of different engineers to complete it, and take their general segregations, made up possibly for financial purposes only, and by resolving them, derive a percentage that is much of a check on any other percent.

11,099

I feel very confident that following the Aqueduct interpretation of auxiliary and direct charges, practically all of this pipe which I have excluded would have been handled in just the same manner as I have handled it; that is, charged in as a direct expense on the work, and following the thing through consistently, it gives me a relation of auxiliary to direct of 16.2% as against Mr. Metcalf's 49%. So my main point is that these construction costs that are in no wise completed, form little indication, if any, of what might be termed the so-called auxiliary costs. If, as Mr. Lippincott's telegram to Mr. Metcalf states, that he would charge all of this hydraulic pipe to auxiliary cost, that is that renewals are part of auxiliary cost, then it looks to me that to the extent that Mr. Lippincott has used base Aqueduct costs, Mr. Lippincott has duplicated one item throughout in all of his estimates, because it is absolutely specified in detail,

by the Auditing Department each year, just what they call expendible material.

11,100

All items of expendible material are charged directly to the work; well drilling machinery renewals; steam shovel renewals; scraper renewals; plow renewals; water wheel renewals; in fact, the whole line of equipment, any renewal is charged up directly to the job, and not carried into any equipment expense. If they had a hydraulic line in, it would seem to follow that any renewals on the hydraulic line would be charged the same as elsewhere; on the Aqueduct they had no hydraulic filled dams of the type of Calaveras.

Herewith follows a table on the question of Calaveras Dam costs.

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COMPUTATION ON METCALF'S ANALYSIS OF CALAVERAS DAM COST, EXHIBIT 194, SHOWING THE EFFECT OF CERTAIN ASSUMPTIONS MADE BY ELLIS.

GENERAL CONSTRUCTION OR DIRECT.

"A" General Construction, Page 1, Col. 2, Ex. 194.	\$549,670
Add Pipes, etc., "Sluicing".	92,724
Revised	<u>\$642,394</u>
"B" "Net Direct Charge," Page 2, Ex. 194.	\$660,000
Add Pipes, etc., "Sluicing".	100,000
Add half tools and supplies (\$15,000).	7,500
Revised	<u>\$767,500</u>

AUXILIARY.

Auxiliary Expense, Page 1, Col. 3.	\$280,285
Deduct Pipes, etc., "Sluicing".	92,724
Revised	<u>\$187,561</u>
Auxiliary Charges, Page 2.	\$315,000
Deduct Contingencies (see "C" below).	\$100,000
Deduct Sluicing pipes.	100,000
Deduct half tools and equipment.	7,500
Deduct Insurance (overhead).	30,000
Revised	<u>\$ 77,500</u>

"C" Apportioning the item "Contingencies," \$100,000 to Direct and Auxiliary Expense in the ratio of direct to Auxiliary under "B" above:

Direct "Contingencies"	\$91,000
Hazen's estimate to complete, excluding overhead (pp. 1 and 2).	\$1,525,000
Elliott's estimate to complete, excluding overhead (\$975,000—\$30,000)	945,000

Excess of Hazen over Elliott.

Apportioning the item \$580,000 to Direct and Auxiliary Expense in the ratio of the combined Auxiliary "B" and "C," to the combined "Direct" "B" and "C" gives:

Direct	\$527,000
Auxiliary	\$53,000

SUMMARY

Direct	Auxiliary	Direct	Auxiliary
"A".....	\$642,394	"A".....	\$187,561
"B".....	767,500	"B".....	77,500
"C".....	91,000	"C".....	9,000
"D".....	527,000	"D".....	53,000
Total.....	<u>\$2,027,894</u>	Total.....	<u>\$327,061</u>
Auxiliary Expense on above computation equals 16.2% of direct costs.		Compare with Item 3, p. 3.	
		Total	\$2,354,955
		Compare with Item 3, p. 3.	\$2,355,000

11,102 (Computation extending Farrington valuation to December 31,
1913, introduced and marked "Defendants' Exhibit 224".)

11,103 Judge Farrington appraised all the watershed lands at \$100 an
acre, and the reservoir lands at \$1,000 an acre, and I left that ap-
praisal as it stood. The starting point on lands was Judge Far-
rington's appraisal of \$12,393,000; all additions to real estate were
carried in at the Company's purchase figures since Judge Farrington's
decision, with the exception of the Pleasanton lands and such
acquisitions. There were some lands and so on that Mr. Dillman
excluded. I think some where they overlapped in connection with
11,104 the right of way, or something to that effect. Those were all de-
tailed elsewhere, but all Merced lands were left in, and all Calaveras
lands were left in. In other words, the grand total we arrive at
here on lands, plus the Pleasanton lands, plus the cost of any of
these lands that have been purchased since 1903, with what Mr. Dill-
man excluded, would probably give these figures as your land figures.
I followed the principle laid down by Judge Farrington as to what
lands should be included, and what lands should be excluded.

I have not eliminated Lake Merced lands in the first computation.
I just drew a computation on the bottom as to what the effect would
be if Merced were deducted. Any Ravenswood lands that were
purchased subsequent to 1903, and excluded by Dillman, would have
been excluded in here. There was no exclusion of any lands below
the Calaveras Dam site. They excluded no land subject to the Cala-
veras. I do not recall, in going over the notes, whether the man who
11,105 made the computation excluded anything below the Calaveras.

Mr. Searls: I understood they did not. These lands were all
bought before Judge Farrington's decision, below.

Mr. Ellis: Their instructions were that all Calaveras lands were
to be included.

11,106 Mr. Searls: I have looked it over, and I know those lands are
in the calculation, myself. The only exclusions are those that Mr.
Dillman has made of certain lands at Ravenswood on the Peninsula
and Arroyo Valle, which were excluded by Judge Farrington, and
the Pleasanton lands did not arise in that case at all.

11,107 Mr. Ellis: Apparently the average price of all watershed lands,
according to the Company's appraisers, was \$83 per acre; of the
City appraisers \$54 per acre; the average of the City and Company
is \$68 an acre, which applies to practically 60,700 acres.

All expenditures on structures carried by the agreed inventory
have been excluded, with the exception of the Calaveras Dam expen-
ditures. I notice that they excluded some fencing on some lands
that were claimed as non-useful. The depreciation, as computed on
the basis of Judge Farrington's allowance, which showed a deprecia-
tion somewhat, up to the last year, under the annual allowance made

by the Company for construction $12\frac{1}{2}\%$ overhead was added to new construction up to June 30, 1907, the beginning of the period of these cases. The $12\frac{1}{2}\%$ overhead was the figure used by Judge Farrington. Since that period we dropped the $12\frac{1}{2}\%$ overhead but, so as to make it consistent with the figures that have been put in, affecting general salaries, we simply carried those in to round out the overhead, since in the construction cost each year there were certain engineering charges, and I could not segregate them out. I simply added in for the balance of the overhead the arbitrary allowance that Mr. Bailhache had taken out of the general salaries out of our operating expense. I also added in all deductions that Mr. Bailhache had made from operating expenses and classified as capital. 11,108

The computations for each year are shown on the following page; the first column on the first line for each year shows the figures as of December 31, of that year; for instance, the first line, 1903, column 1, \$12,000,000, is Judge Farrington's value of lands; the \$12,721 was land purchased in 1904, bringing the total lands to December 31, 1904, \$12,406,000. That procedure was carried on throughout. The accrued depreciation at the time of the Farrington valuation, according to these figures, was \$2,922,000. To this was added the computed depreciation for each subsequent year; that is, the depreciation on the existing structures, and the depreciation on additions. The depreciated value column is the difference between columns 2 and 3, and the total value column 5 is the sum of columns 1 and 4. 11,109

The deduction shown on the first page is just to show the effect of deducting the difference between Judge Farrington's value, and the Company's value of Merced in this case. It was not carried into the table.

The large maps here were started by Mr. Noble, and were prepared largely under my direction. They correctly show the topography of the Spring Valley Water Co. They have been re-checked in the office, and are presumed now to incorporate the lands correctly, and to conform to the Company's maps on the same subject. The figures on each parcel have been checked with the Company's records, and the information I think was gotten on consultation with the Company's men on that subject. 11,110

(Map entitled "Peninsula" introduced and marked Defendants' "Exhibit 225".)

(Map of "Lower Alameda", introduced and marked "Defendants' Exhibit 226".)

(Map of "Upper Alameda", introduced and marked "Defendants' Exhibit 227".)

Witness: LEONARD METCALF for Plaintiff.

11,111 Mr. Metcalf: In preparing "Plaintiff's Exhibit 194", I was attempting not to express my opinion as to how I would make the estimates, but how I understood Mr. Lippincott would make it, according to the testimony which he had given in this case, and I assembled the data in that way. The procedure suggested by Mr. Ellis is a logical one, and I see no reason why a man should not keep his costs in that way and get results of value for use in estimating, and I judge that he has been in the habit of doing it that way. I will make this suggestion with regard to the application of his own method, however, which he implies that he does admit, that if he charges into auxiliary expense the machinery equipment, then the first cost of the sluicing pipe lines to the various pits I think should be included with those auxiliary costs, and as the Company has used four or five pits, the amount of those would make a substantial difference in the percentage which he finally gets. I think he is right in stating that I should have made some allowance from the contingent item into direct charges, and not put it all into auxiliary; that was an oversight on my part. I think, however, that a subdivision which would give him but 10% of that in the auxiliary charges is too low; looking at it in a broad way, I should expect that auxiliary part of that contingent charge to be much heavier.

11,112 We sent a telegram to Mr. Lippincott last night, which telegram I read to Mr. Ellis before I sent it; this was the telegram: "In applying your method of estimating costs of dams to such a dam as Calaveras, would you classify original cost of all sluicing pipe used, and cost of sluicing pipe used to replace worn out pipe as direct basic cost or as auxiliary cost. Kindly wire. Am trying to make segregation of actual Calaveras costs along lines of your method for comparison with your forty percent auxiliary cost estimate."

This was the reply which I got from him this morning:

"Transmitted your wire by 'phone to Mr. Lippincott, Riverside, who instructs me to wire you, include all costs mentioned as auxiliary costs; engineering offices J. B. Lippincott".

Mr. Ellis: The only thing I cannot reconcile is how there cannot be then some apparent duplication in all Mr. Lippincott's cost analyses so far as they are based on direct costs on the Aqueduct, because specifically on the Aqueduct all these base costs include all equipment renewals, and he assumes those base costs as kept by the Auditing Department, which includes the renewals, and then if he uses the 40% on top of that, which also includes all renewals, why he has renewals all through his costs twice.

Mr. Metcalf: There are just two other things in that connection that I might mention; one is that I expected to find that the 51% which I found as the amount of the auxiliary costs as compared with

the direct costs would be somewhat less upon the whole work than upon the portion already completed. On the other hand, I do think that it gives some guide, because in this particular work, a very substantial part of the cost comes in the piping and the machinery, which I understood was classified by Mr. Lippincott as auxiliary expense.

The other matter is that it does not seem to be quite fair to Lippincott to say that it is indicative that he would charge to the auxiliary costs all of the repairs. I have not so accounted the Calaveras charges to date, except as regards the sluicing part. The steam shovel repairs, and various other repairs, were accounted to the direct costs. My idea with regard to the sluicing pipe, attempting to interpret Mr. Lippincott's views, was that he considered that in-as-much as a great deal of this pipe was used, and new pipe was constantly supplied, he would consider that in the class of the equipment which was necessary. There is no salvage value to speak of upon it, and therefore, I so classified it, and apparently that is his view. I do not think that he would classify the repairs to steam shovels, or to other equipment of that sort to auxiliary costs. I think he has simply added in the first costs of those, as I have attempted to do here. This exhibit was only introduced in order to give you the benefit of such information as was available on the Calaveras Dam.

11,113

ONE HUNDRED AND FIFTY-SECOND HEARING.

MAY 5, 1916.

Witnesses: JAMES K. MOFFITT for Defendants.
F. P. MUHLNER for Plaintiff.
J. J. SHARON for Plaintiff.

(Counsel for Plaintiff called attention to a statement made on page 10,811 of the record, where it was stated in effect by him that the complaint did not include the Ravenswood properties, whereas it was discovered subsequently that the complaint did include all the Ravenswood properties down to San Francisquito Creek, about 1,846 acres.)

11,114

(Certain photographs Nos. 74 to 80, inclusive, showing trees on the Peninsula, heretofore marked for identification, were received in evidence.)

11,115-16

Witness: JAMES K. MOFFITT for Defendants.

Moffitt

DIRECT EXAMINATION BY MR. SEARLS.

I am 50 years of age, and reside in Piedmont, California. I have been cashier of the First National Bank of San Francisco for 15 years, and as a part of my position have occasion to be familiar with the

rates of interest that the various corporation securities pay, both stocks and bonds.

11,118 I believe that a water company such as the one under discussion, having, as I understand it, a perpetual franchise here, and a guarantee in the ultimate of rates that will give a certain dividend rate to its stockholders, if that is a law, and is established clearly, and their real estate is not used for the purpose of their watershed, or furnishing water not a part of their distributing system, and they allowed the increment that comes to that, then I believe, in following this matter through the last few years, as it has come to me, that I would fix the rate of return at which investors would be satisfied over a continued term lower than some of the estimates that I have seen friends of mine place. I would feel I would err in fixing that minimum as low as 5% on the money they had actually put into the corporation. I won't say, in the shape of stock; I am talking about actual values now, and I always want to make a reservation when I discuss stocks in public service corporations. I understand that the guarantee which the courts give under the 14th amendment is a guarantee enforceable by litigation; it is not in the nature of a guaranteed return in a franchise.

11,120 I should consider that if a piece of property were bought that had clearly water possibilities, and would be used in the development of the business of a growing corporation, that it would clearly, and should be included as a part of the properties on which returns should be given. I have in mind what I consider clearly marked out in these other companies, real estate that cannot be considered appurtenant to a water company, the same as the Peoples Water Company, over in Oakland, where tremendous bodies of land are taken in, but which I could not conceive, under any reasonable assumption, ought to be considered as a part of the water system that is supplying these bay cities, and be allowed interest in a water company as such.

11,121 My statement of 5% would be on the property actually used and
11,122 useful, and whatever the Court might decide was reasonably necessary in reserve for future use.

CROSS EXAMINATION BY MR. MCCUTCHEN.

I draw a distinction between perpetual franchise and perpetual monopoly in my assumption that the company whose rate of return I have fixed has a perpetual franchise. I assume that the business is one that may become competitive. I have not considered as a serious factor that competition might have the effect of reducing the net income below 5%.

11,123 As I understand it, the decisions of the Court are uniformly for granting such rates to this or other companies that a proper return should be made on their actual investment, without guaranteeing them whether they will have 10,000 or 100,000 rate payers. If this return
11,124 could only be anticipated for one year, I do not think it would be

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adequate. I said that if I understood the legal situation, it was fairly definitely established; if it is a matter of throwing it into the courts steadily for interpretation, I say no, I would not want to be a stockholder in a water company at all, but if you gentlemen get through this constant threshing out of things a definition that will allow you to go on fairly steadily, I say 5% would satisfy me if I were an investor in that company. I mean by that I would be willing to invest my money, or that of my clients, if I were reasonably sure of 5%, and I do it in other things.

Unless the condition in this case was such as to reasonably insure an intelligent investor that the dividends would be at least 5%, I would say that the stock could not sell at par. 11,125

I know that this company has been compelled to institute a suit every year for the past ten or twelve years, for the purpose of setting aside the ordinance rates upon the ground that they were confiscatory, and I think that would naturally affect the mind of the investing public. 11,126

I could not assume that continued return was guaranteed, and I did not. My statement was entirely dependent upon the gradual crystalization of some definite propositions on the legal status of this company, but I was hoping you were getting to that point, and if I had not assumed that you were getting to that point, I would not make the answer that in my opinion 5% was a fair rate of return.

I know that the City has for a long time contemplated bringing in a water supply to be operated by itself, and that a large sum of money has been spent towards the accomplishment of that purpose by the municipality. I know that by the action of the electors of San Francisco the issuance of bonds in a very large sum has been voted to accomplish that purpose, but in looking over the whole field I would not consider it a serious factor, knowing the position of the City and of the Spring Valley. It is my opinion that the City will ultimately buy the Spring Valley properties. 11,127

I think the fact that the managers of the Company were not influence to sell the property at less than its worth, indicates that they considered that it will for the future pay a return of 5% upon the value of the investment.

I know about the plant at Vallejo that was owned privately at the time the City concluded to construct a plant of its own. It went on the toboggan. That is the only one that I have knowledge of the facts concerning, but I do not consider that a fair analogy at all. As a stockholder of the Spring Valley Water Co. I would not be afraid of competition with the people at large, and I think the attitude of the ordinary investor has been shown by the way they have acted in the last two or three years when this thing has been a matter of public debate every day. 11,128

11,129 Assuming that conditions become fixed, and that investors could become reasonably certain that the conditions so established would continue, at least for quite an indefinite time, I think investors would be willing to buy this stock on a 5% basis.

11,130 In 1903 the stock of the Spring Valley was on the par value of \$100, but half the number of shares, and it sold along through there very close to par, and I think they were paying about 5%. My remembrance of the stock was that it ran up in the nineties, so if they were paying 5%, they were not getting much above 5% at that time. I said here today that I assumed in Mr. Searls' question that what real properties the Company held they would be allowed the increment in value which naturally comes to any large body of property. Not the increment in value on all the properties which the Company owns; I segregated the properties that could not be considered as appurtenant properly to developing water. I assumed the man who bought the stock got the increment in value on the properties not used for water supply, and that is what he was getting when he was paying 94 and 95 for the stock. The man who bought the stock at that time for 90, or 94, or 95, was not influenced, in my opinion, by the expectation that he was going to obtain a profit on account of the increase in the value of the properties which were not necessary for water producing purposes. That matter is only being clearly marked out by the litigation of the last year, as I understand it.

11,131

As I have known matters in the last year, with the litigation not cleared up, I would not have been willing to buy that stock, say from 1906 on, as an investment, at a price that would yield less than 6%. I did buy some of it on a 6% basis in anticipation of the sale to the City. I think I should have taken the chance whether the City was going to take the property over or not, but I happened to be investing my money at that time.

11,132 When I speak of a rate of return of 5% upon a given principle, I draw a distinction between the value of the property and the market value of the stock. When I stated that a fixed return of 5% would be fair, I did not mean a return of 5% on the selling price of the stock on the market. If the Company put \$10,000,000 more of the stockholders' money into the property, actually increasing the value of the property to that extent, I think then the stockholders are entitled to a return of 5% on that; that would be an equitable assumption.

Assuming that the Railroad Commission, or some other tribunal, shall fix the value of the property used and useful in supplying water to San Francisco, and shall fix rates which shall yield 5% net upon that value, I think the investors will buy stock at that rate of return; that is, they will buy at par, and any factor regard-

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ing possible competition with the City through the development of the Hetch-Hetchy system is not going to scare the people.

11,133

If the Company is compelled to borrow from \$8,000,000 to \$12,000,000, I recognize that an obligation of that property would be secured by a first lien on the property. To assume that the investor realizes that is to come about, as to whether he would be willing to invest his money only upon that assurance of 5% return is a proposition that is general; if you encumber any property with prior liens, you are acting in a manner to the prejudice of the shareholder, except at the same time he has got added protection under the money that is put in. I recognize that this company, if it had anything like a monopoly, would be justified in getting all of the money necessary to develop the property to its utmost capacity for the purpose of supplying San Francisco and its inhabitants with water.

11,134

Any increase of a first lien ahead of a shareholder, not directed to improvement, would adversely affect the stockholders' interest. If he knew how and what the money was spent for that was borrowed, and he knew that the Company was to continue in the future without opposition, whether that would strengthen the Company rather than weaken it would depend on where the money was spent. I do not think the management of a company that has been as well managed as the Spring Valley in the last ten years would put \$12,000,000 or \$14,000,000 into new works if they expected to meet competition with the City in the immediate future.

11,135

I know that the City is proceeding to build its plant, and I feel certain that Hetch-Hetchy water will be brought here some day. I am not confident that it will be brought here within ten years. I would rather take a chance with the Spring Valley than take a chance with that. I think that the investor who bought this stock on a 5% basis would be taking a chance, but not any more serious a one than in any other stock. I don't think an investor would be taking any more chance in this case than a man investing in First National Bank stock. I don't think that a man who would buy Spring Valley stock on a 5% basis, with the possibility of municipal competition coming in within a few years, need have any more fear about it as an investment than the man who put his money into the stock of the First National Bank.

11,136

My difficulty is this as to what really constitutes a proper valuation of the capital assets of the Company; generally where all this great trouble has arisen from in public service corporations is in the watering of the stock of the corporation. There is where I think the great difficulty has come up. If we could satisfactorily arrive at a fair or just valuation of the capitalized assets of the Company—I mean capital assets of the Company looked at as a going concern—it seems to me that is what we want to do. In this

11,137

11,138 case I went on the assumption that the Company has a perpetual franchise, is that the question for you and the court to decide, so that your company will be on a stable basis; then I say that the fact of compensation I wouldn't be afraid of. The Railroad Commission will fix the value and the rates, but in fixing the rates they cannot take into account the fact that the company is to occupy the entire field and supply all the water that is to be supplied. The matter of competition is always present. It is not my understanding that the Railroad Commission would fix rates which would yield 5% if the Company did only one-half of the business, and it is not my understanding that they would fix rates which will yield the Company 5%, assuming that they sell all of the water for which there is demand. If there is no present competition why should it be taken into account? I am thinking of it from the standpoint of a man who has his money to invest. If I were to go to the point that the Railroad Commission had fixed the value, and has established rates which will yield 5% upon value, assuming that the Company sells all the water for which there is demand in the municipality, then in answer to your question as to whether I had taken into consideration the Hetch-Hetchy situation, I simply come back and say "What has been the attitude of the stockholder in the Spring Valley Company"? I think he has shown that he is not very seriously affected by the possibility of competition, and that possibility is growing comparatively less every day.

11,139

The stock has fluctuated a great deal, due to speculation. In my previous statement I was talking about the man who is willing to put in money, and to stay with the company, and get 5% return, and I was also talking about the conditions which would satisfy the investor that he would get 5%.

11,140 Investors in this market expect to receive 5% return on first mortgage bonds of corporations that are well secured. Of course, the best bonds are selling at a rate that yields less than that; take railroad bonds, first-class, the bonds are selling down to $4\frac{1}{4}$ and $4\frac{1}{2}$ %. Those are bonds of corporations organized out of this state. The San Francisco and San Joaquin Valley Railroad bonds are selling at a rate that brings them down to about $4\frac{1}{4}$ %. There ought to be a difference in rates between what a man who buys stock should receive, and what a man who buys bonds should receive. In the case of fine, good securities, like mortgages, the rate is higher, but the difficulty of looking after them on the part of the private investor at maturity, the necessity of replacement, and expense of such things all have to be considered. The market ability of a security like Spring Valley on the exchanges has to be considered; of course, that works in its favor, as it would with any stock of that general character,—the convertibility of it is a great thing. I think that is taken into very serious consideration by a

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man who wants a permanent investment, as there may be occasions when he wants his money quickly. I am not willing to express an opinion as to the yield which one investing in stock should receive generally as against one who invests in bonds. I think you have to consider the individual factors as any investor would. I don't know what relation the return of stock of a corporation should bear to the return on bonds of that same corporation, without knowing the corporation. 11,141

Take the Pacific Gas & Electric Corporation: Their underlying bonds are selling on a 5% basis, and their 6% stock sells at about 90. That is an example. I cannot recall any other corporation about here. 11,142

Supposing the Railroad Commission fixed a value upon this property, they would not destroy the value in the property, whatever is there, that ought not to be taken into consideration. They could not take the other properties from the shareholders that belonged to them. The property which is not used for the purpose of supplying San Francisco with water is part of the value that the stockholder assumes when he has 100 shares of stock of the Company. 11,143

When I stated that the investor would be satisfied with 5%, I meant 5% on the value of the property used in supplying the municipality with water, and not 5% on the property of the corporation not so used. What I said was, that I thought there could be a fairly amicable decision as to what fairly constitutes the properties of the Water Company as a water company, and that I thought 5% return on that value was a fair one, and one with which an investor would be satisfied.

I don't think that what the Railroad Commission has to do has anything to do with the situation. I brought the Railroad Commission in simply as one of the possible factors that might be regarded as an adverse one, although I do not say it is an adverse one. I do not think that the existence of the Railroad Commission is a source of fear to the investors. I think, with going concerns that are looked on as well managed, that the existence of the Railroad Commission has strengthened all these companies in the mind of the public. I would pick out companies like the Spring Valley Water Co., the Southern California Edison Co., Pacific Gas & Electric Co., etc., and I would say that the investors therein feel strengthened by the Public Utilities Act and the Railroad Commission. 11,145

I predicated my answer in regard to the 5% return on some sort of a satisfactory solution of some of these things that have been constantly fought over in these annual rates. I have said that the man who bought stock during the years 1907 to 1914 of the Spring Valley Co., was influenced by the fact that the company had a lot of lands not used for water business which were going to 11,146

11,148 enhance in value, and which would add to the real value of the stock, if that is the case I would put the Spring Valley in a different category from a good many corporations whose stock issues I was not familiar with; there is a knowledge of the sound financial basis of the assets of the Spring Valley Water Co. In my answer on direct examination I said that there was an element of increment in the lands which were not used for the purpose of supplying water, and that that element of increment would naturally come to anyone that held that land. If the Company had disposed of all of its lands not used for the purpose of supplying water to the municipality, my answer, I think, would have been the same; it would be a question in general easier of solution if those lands were eliminated.

11,150 I admit these facts about the Hetch-Hetchy which were patent, and the attitude of the City, and yet I feel the present stand of the Company and the stockholders is that they do not believe seriously that such future competition is to destroy the values that are really in that company. I take my stand on this, that I do not believe you can destroy a value that exists. I have no fear in the ultimate that if San Francisco were to come in here with its competitive supply and parallel all the mains of this Company, as to whether the mains of the Company could then be considered as valuable after that event as before, because I assume that is not a factor that I need reasonably take into account.

11,151 If the Spring Valley has competition, it can dispose of its properties used for supplying San Francisco with water at a valuation that will satisfy its stockholders. I do not think that the fact of the Board of Supervisors of San Francisco at one time passing a resolution to the effect that the Spring Valley had better sell its lands to the City at a reasonable price, otherwise, the City would bring in an outside source of supply, and the property of the Company would have value for agricultural purposes only, would induce the investor to seek Spring Valley securities, but I do say that the whole history of the Spring Valley shows that the people have confidence in it, and I do not think they are going to shake that.

11,152 The last short-term notes of the company were placed at 5, nominally, and if the money cost the company more than 5, it should not have been paid. Those notes would be snapped up at par. Our bank would have taken 4 times as many as were allotted it. Those notes were excellent security. I don't know what the Company will have to pay for the money to make the Calaveras improvements. I could not form an opinion here now. I would not be willing to express any opinion as to what the Company would have to pay net for that money. I would expect the Company to get it at 5% net.

If I were to assume that none of these things that I think will come about has come about, that is to say, that the Company has

not been able to get along with the City, that they have not had any permanent value fixed, and so on, but that all of those things are ahead of the Company, and also eliminating Judge Farrington's decision, then the question as to what rate of return the investors should have received between 1907 and 1914 is narrowing the thing down to a short-term investment. Speaking of the life of the Company, we went through some disturbing conditions through those years. In 1907 to 1914 we went through the panic of 1907, and through what might be called a panic at the time of the outbreak of the War. It is difficult to form an opinion on just that term. My statement is that in view of the troublesome things not having been cleared up, and in view of other conditions that may be regarded as adverse, I think the stock and bonds of the Company have shown remarkable stability; that has inspired confidence in investors.

11,153

11,154

I don't know what rate of interest a man who invests in the stock of such a public service corporation during those years would, with the conditions as they then were, have expected to receive. What an investor should have received under those circumstances averaged over the period it would be pretty hard to say.

The amount of 5% under those circumstances, that is, running over the last 7 years, might have been low, and inadequate.

RE-DIRECT EXAMINATION BY MR. SEARLS.

As I said, those years include two very severe crises in the general money markets of the world, and for a short time the money rates were very high; if you wanted to place any obligations running 6 months or a year you had to pay very high rates for it.

11,155

I think, in view of the disturbed condition of the money market generally, especially here, when we were going through the period of construction, that 5%, which might be attractive at another time, would not have been attractive at that time; I think it is fair. Taking it as an average for the whole period, there were some times during the 7 years when the market was pretty fair, and some times when it was disturbed. I think there were conditions surrounding the general markets, and in the San Francisco market, especially, that would make a return in years succeeding 1907 that was fair and reasonable at another time, seem actually low at that time. That would apply to the years succeeding the fire here, probably the first three or four years succeeding the fire, after which time we went into that period of turmoil in 1914. Now we are going into a period looking ahead when it looks like money would be cheaper than ever in the history of the world.

In testifying to the 5% as a reasonable rate of return for this corporation to earn on the value of its property used in its business of supplying water during the years from July 1, 1907, to June 30,

11,156

1915, I was testifying purely as to what I considered a permanent going business when I said 5%. I thought we were looking forward on that. I do say that in the years succeeding the fire that conditions were such that no investor could be logically held in those years to what he might consider a permanent going basis.

11,157

(A sheet showing the dividends paid during the years by the Spring Valley Water Co., reckoned both on the basis of 280,000 shares, and an equivalent amount on 140,000 shares, introduced and marked "Defendant's Exhibit 228".)

Muhlner

Witness: F. P. MUHLNER for Plaintiff.

11,159

(A certain elimination was made on a table appearing on page 11,033 of the record, which contained a tabulation of the source of money expended on new construction, etc. The portion of the table stricken out has also been stricken out of the abstract, and does not appear therein.)

Sharon

Witness: J. J. SHARON for Plaintiff.

11,160

DIRECT EXAMINATION BY MR. GREENE.

I have the award of contract for the construction of the outfall sewer and appurtenances in San Francisco Bay at Bakers Beach.

(The admission of this was objected to, but the ruling was that it would be received in the same way as evidence of outfall sewers in the Plaintiff's case; in other words, it is taken that the figures will be in no sense comparable with the submarine pipe work, except in the most general way.)

11,161

Included in this award of contract is the furnishing and laying of 18-inch cast-iron pipe with flexible joints, at a price of \$18 per lineal foot. The pipe here is for the submerged portion of the sewer that was laid, and corresponds with the submarine pipes of the Company across the Bay of San Francisco, only in the form of joints. The pipes of the Spring Valley Water Co. across the bay are four in number, two of them 16-inch, lap-welded steel pipe, with flexible spigot and bell joints. The other two are 22-inch pipe lap-welded steel with similar flexible joints. The steel pipe is more expensive as to material. The date of the contract was July 24, 1914, and it was awarded by the Board of Public Works of this city to Robert C. Storey & Co.

(Certain corrections were made by Mr. Sharon in the statements that he had previously made.)

11,162

(It was agreed by Counsel for Defendants that it was satisfactory to the City that the right of way appraisal which the Court

might find on the basis of the testimony of Mr. McDonald and Mr. Radle might be taken as the values for the years in controversy, instead of applying either a deduction for the years that preceded 1913, or any increase for 1914-15. That stipulation, however, is not to apply to any purchases during the years in question of additional rights of way such as the Baden-Merced right of way.)

11,164

(A copy of the report of Mr. O'Shaughnessy was introduced and marked "Plaintiff's Exhibit 229". It was admitted purely in connection with the cross-examination of Mr. O'Shaughnessy on the point of inclusion or exclusion of properties in use, and not in evidence as to any matter of valuation by him.)

(The matter of putting in evidence by Plaintiff, the expenses of trial of these rates suits, was allowed to go over until the time of argument.)

(With reference to page 9,527 of the record, in regard to Table 1, "Defendants' Exhibit 185", the portion of the testimony up to 1903 was stricken out.)

11,165

(The offer to prove that in 1913 the water rates committee of the Board of Supervisors in its report of April, 1913, to the Board, recommended that the Board include the Lake Merced properties of the Company in its basis for fixing rates for that year, but that they would not be so included for the year commencing June 1, 1914, and that said recommendation was made the subject of a formal resolution before the Board of Supervisors, but that the resolution was never put to a vote, and that subsequently resolution J. R. No. 816 was passed by the Board, and that no report was made in answer to this resolution, and that no action was subsequently taken by the Board of Supervisors in connection therewith was rejected.)

11,166

11,167

(Objection was made to an offer of Counsel for Defendants, which appears at page 7,911 of the record, to show an allowance of overhead made by Mr. Schussler in an affidavit in the 1908 case in a proceeding for a preliminary injunction. The objection was sustained.)

11,170

(Objection was made by Counsel for Plaintiff to that portion of Exhibit 211, Higgins' testimony, beginning on page 3, nine lines from the top, commencing with the words "I was" and ending with the word "foot". The objection was overruled.)

11,171

(Objection was also made to the same exhibit, commencing with the words "These brick", going through to the bottom of the page, including the last sentence, "I do not know much about that, but I think it was about that". The objection was overruled.)

11,172

(Referring to the same exhibit, page 4, commencing with the question 16, and going through the words and figures "\$9.50 per thousand". It was ruled that that may stand as it reads, although it is not exactly responsive.)

11,173

11,175-79 (The Complaint in the case entitled "City & County of San Francisco, a municipal corporation, Plaintiff, vs. S. V. W. Co., etc., et al, No. 73,708, from the files of the Superior Court, City & County of San Francisco, State of California, in eminent domain", was offered in evidence, but was objected to by Counsel for Defendants. The objection was overruled, and it was marked "Plaintiff's Exhibit 230".)

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